DEVELOPMENTS IN THE PRODUCTION AND USE OF ETHANOL FUELS

JOINT HEARINGS

BEFORE THE

SUBCOMMITTEE ON
INVESTIGATIONS AND OVERSIGHT

OF THE

COMMITTEE ON
SCIENCE AND TECHNOLOGY

AND THE

SUBCOMMITTEE ON WHEAT, SOYBEANS,
AND FEED GRAINS

OF THE

COMMITTEE ON AGRICULTURE
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CONTENTS

WITNESSES

	Page
July 6, 1984:	
John Dunn, State representative from the State of Illinois	3
Vince Maloney, on behalf of Hon. Charles H. Percy, U.S. Senator from the State of Illinois	4
W.R. Schwandt, vice president and general manager, ethanol business unit, A.E. Staley Manufacturing Co., Decatur, IL; Jack Reed, vice president, Archer Daniels Midland Co., Decatur, IL; Al Mavis, Alenco, Rochester, IL; Rudiger Graf and Katherine Graf, Graf Feed & Fuel Alcohol, Watertown, MN	9
Wallace E. Tyner, professor and assistant head for research, Department of Agricultural Economics, Purdue University; Robert J. Hauser and John B. Braden, assistant professors of agricultural economics, University of Illinois	49
John A. Beatty, member, board of directors, Illinois Farm Bureau; and William C. Holmberg, program manager, solar lobby	99
Daniel E. Beckman, Deputy Director, Office of Alcohol Fuels, U.S. Department of Energy; and Robert L. Donahue, director of aeronautics, Illinois Department of Transportation	120
August 14, 1984:	
Dave Hallberg, president, Renewable Fuels Association; and Hoyt Pattison, a representative in the State legislature of New Mexico	149
Charles A. Clark, president, Ethanol Producers of New Mexico, Clovis, NM; Joseph W. Bishop, president, The Midwestern Companies, Inc., accompanied by Eugene Mason, chief counsel and executive vice president, Joplin, MO; and Jerry Raines, president, Mountain Development Corp., accompanied by John Martz, executive vice president, Portales, NM	189
Donald Z. Forcier, accompanied by Robert A. Robinson, U.S. General Accounting Office, Resources, Community and Economic Development Division; Caleb Chandler, senator, State of New Mexico; James P. O'Neill, associate director, Department of Taxation and Revenue, State of New Mexico; and Doc Weiler, executive vice president, Association of Commerce and Industry of New Mexico	215
Reno Zanussi, Grain Power Limited; Gary Bunger, Clovis, NM; and Leland Tillman, director, Eastern Plains Council of Governments	256

DEVELOPMENTS IN THE PRODUCTION AND USE OF ETHANOL FUELS

FRIDAY, JULY 6, 1984

HOUSE OF REPRESENTATIVES, COMMITTEE ON SCIENCE AND TECHNOLOGY, SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT, AND THE SUBCOMMITTEE ON WHEAT, SOYBEANS, AND FEED GRAINS, COMMITTEE ON AGRICULTURE,

Washington, DC.

The subcommittees met in joint session, pursuant to call, at 9:30 a.m., at the Richards Treat Center, Milliken University, Decatur, IL, Hon. Richard J. Durbin presiding.

Present: Representatives Durbin, Simon, and Skeen.

Mr. DURBIN. I would like to call this committee meeting to order.

This is a joint committee meeting between the House Science and Technology Committee and the House Agriculture Committee, and we are certainly pleased to be here today at Milliken University in Decatur, IL.

To my left is my colleage on both committees, Congressman Joe Skeen from New Mexico. A little later this morning Congressman Paul Simon, who also serves on the House Science and Technology Committee, will be joining us. Unfortunately, Congressman Ed Madigan, who was to have been here this morning, had to attend a funeral in his district and is unable to join us, but he certainly is interested in the topic as well.

By way of opening remarks, I would like to just remind everyone here that it wasn't that long ago that we dealt with gasoline lines in the early seventies, and in 1978 Congress passed the Energy Security Act to spur the development of industries that could provide alternative fuels so that we would not be reliant on unstable foreign sources of petroleum.

In some respects, that seems like an awful long time ago. Prices at the fuel pumps have been stable for some time now and we're no longer at the mercy of the Persian Gulf to keep our cars and tractors full of gas. Nevertheless, it wouldn't be very smart for us to abandon the successes we have had in creating an alternative fuel industry.

It is my belief that one of our true success stories has been with ethanol. Ethanol offers a lot of advanges. We are creating a fuel that doesn't deplete our oil reserves, and yet, at the same time, gives value to crop surpluses that have plagued our local and national farm economy. Ethanol, as a fuel additive, represents a safe and environmentally preferable substitute, especially now that the

hazardous health effects of leaded gasoline have been firmly established. It is not always so easy to find such an attractive substitute that is really making no major significant public health risk in this country, and yet we have it in ethanol.

As we have seen with our local industry here, ethanol is in demand. Gasohol has made it possible for central Illinois and southern Illinois to enjoy the benefits that accrue from a healthy industry that grows each year—steady jobs, a positive trade balance, increased investment, and a readily-available fuel. Because the ethanol industry is just coming into its own, it is important that we carefully examine today the impact of Federal policies to make sure they promote this important new resources, rather than impede it.

We have a narrow self-interest here, Mr. Skeen, in Illinois. We produce over half the ethanol of the Nation. We are, in fact, as someone has characterized it, the "Saudi Arabia of ethanol" in the United States. We want it to grow. I don't know that we want to have some of the other trappings of that part of the world, but we certainly want to see Illinois and the Midwest and our agricultural areas become a source of energy for our future.

We need to fully understand the economics involved in this process. It is not enough to be pledged to increasing the use of ethanol. We have got to work on the economic mix that's going to be important and necessary to make it a growing industry. We need to be fully knowledgeable about the technology that can make it possible. In short, we need to understand how this industry works, and there is no better place to start that conversation than here in Decatur, IL, which is an important contributor by way of industry and agribusiness to the ethanol industry.

I would like to thank all the witnesses for taking the time and effort to appear here today, and you can be sure that your expertise and thoughts are appreciated.

I would like to turn it over at this time to my colleague and friend, Joe Skeen from New Mexico.

Mr. SKEEN. Thank you very much, Dick. It's a pleasure to be back in Decatur. It is always a pleasure to deal with you and be a recipient of the fine hospitality that you always afford when I come here, except for one thing, Dick—this running around town with "Dick Durbin for Congress" stickers on the back. I get to reciprocate when we have our hearings on ethanol in New Mexico on August 14. But I want to wish you well.

We do have a common interest, particularly those of us who understand the technological development in this area of fuel production and its importance to the United States. Our country is a vastly different one in the type of production that we have. The small grains that we produce from the maizes and the rest lend themselves to ethanol production. And we have been an area of rapid development in this particular area—not without its problems, mostly economic, that are suffered by many phases and many elements that have been dedicated to the development of this kind of fuel. It is a new industry. We understand that. It has its problems. But it is developing rapidly and I think it is extremely important.

I want to commend the leadership of both of the committees that we serve on and those that are interested here today who will be on the witness list for their interest. We hope to keep this thing going. We have good news insofar as the Federal sector is concerned, because the bill that is up for the President's signature now has a 6-cent tax benefit for this industry. I think that's a very important thing.

I think the States ought to take a look at the possibility of extending tax advantages as well. New Mexico is one, I think, that has done this, and done it very well. Someone asked me earlier, they said "How come New Mexico is putting 11 cents a gallon tax credit?" I said, "Well, they had a very strong lobbying group in the legislature." So, Mr. Dunn, you can take it from there.

It is nice to be here. Thank you all for the great hospitality. We appreciate you witnesses that are here to give us the benefit of your experience today.

With that, Dick, thank you.

Mr. DURBIN. Thank you, Congressman Skeen.

By way of introduction and welcome, I would like to introduce to you—and we are pleased to have him—the State representative from Decatur, IL, John Dunn.

John.

STATEMENT OF JOHN DUNN, STATE REPRESENTATIVE FROM THE STATE OF ILLINOIS

Mr. DUNN. Thank you, Congressman Durbin, and Congressman Skeen. Welcome to our community and our area. It is especially pleasing to have you here today and to know that Congressman Paul Simon will be joining the panel later.

We in Decatur know that sometimes we feel like we're overlooked because of our geography. We are close to the University of Illinois, close to Champaign, but we're between both of them and we feel that sometimes things pass us by. It is especially nice to know that the Congress of the United States cares enough to come here to hold these subcommittee meetings in our locality today, so that all of us who wish to have input can have an opportunity to make our comments known.

Not all of us, of course, can afford to take the time and effort and spend the money to travel to Washington, so we are especially grateful to you for coming here today, and not only for coming here today, but for coming here a second time.

Ethanol is as very important item on our agenda in this area. As you know, we are a major agricultural producer in this area. We have major agribusiness and we feel that this interest is vital to the economy of our area.

In the Illinois General Assembly I have served on the Agriculture Committee and have been very active in the Illinois Legislature with regard to the ethanol issue. From what I have seen, it appears clear to me that we can do some things at the State level, but the major emphasis with regard to ethanol and its subsidy and the incentives for its production to provide alternative energy sources for the United States of America must come from the Federal Government and the Federal Congress. Anything we do at the

State level can be helpful, but those of you who are an industry and who market nationwide know that there is nothing worse than a patchwork, a quilt of regulations from one State to another that you must interpret and understand and deal with. It is better, with regard to something like this, that affects our entire Nation, to have a nationwide policy. So we hope that you can see your way clear to help us in the area develop ethanol so that it will be a viable alternative fuel, and so that our economy here can prosper, flourish and grow.

We welcome you to Decatur. We hope you stay a long time. We're glad that you came back. It's significant when someone comes to Decatur, Congressman Skeen, and comes back. It's a good sign that you had a good impression of us here the first time. We hope you come back many, many times, and thanks to each of you for being here today.

Mr. DURBIN. John, thank you very much. You are certainly welcome to stick around and help us participate in this hearing.

At this point I would like to introduce Mr. Vince Maloney, who is on the staff of Senator Charles Percy, who will be making a statement on behalf of the Senator.

Mr. Maloney.

STATEMENT OF VINCE MALONEY, ON BEHALF OF HON. CHARLES H. PERCY, U.S. SENATOR FROM THE STATE OF ILLINOIS

Mr. MALONEY. Thank you, Congressman.

First of all, as the Congressman did mention, my name is Vince Maloney and I am representing Senator Percy who this morning is in northern Illinois and unable to attend this important hearing. The Senator has prepared a brief statement which he would like for me to read to you. I will be brief, I promise.

First, I would like to commend Representatives Durbin and Skeen for scheduling this hearing on a subject of great importance to me and all of Illinois. It is entirely fitting that the hearing is being held in Decatur. Over half of the domestic fuel grade ethanol marketed in the United States in 1983 was produced within 100 miles of this city.

Mr. Chairman, on June 11 I had the distinct honor of breaking ground for the new fuel ethanol plant outside of Rockford. This plant will produce 3 million gallons annually of high-grade anhydrous ethanol for blending with gasoline. Although relatively small in size, this plant will eventually use 10 percent of the corn grown in Winnebago County. It will result in higher prices paid to farmers and benefit the entire local economy.

Also at that time I released a U.S. General Accounting Office study on the fuel ethanol industry and the need to maintain Federal tax incentives. There are copies of this study available this morning, and if anybody—I see we still have copies. If you do run out and you need more, just inform me, if you would, please.

In a nutshell, the GAO has found what I have believed since 1977 when I first introduced the original Federal highway tax exemption for fuel ethanol blends, then called gasohol. Namely, that it has increased farm prices, created new jobs, and provided us

with an alternative transportation fuel in the event of a national energy emergency.

For example, in 1983, with sales of domestic product of 375 million gallons, the GAO estimates that corn prices increased 4 cents per bushel with overall farm prices nationally increasing by $393 million. By 1990, with annual production of 1 billion gallons, corn prices could increase by 15 cents per bushel and overall farm income by $3.59 billion.

The GAO also found that 19,584 jobs had already been created by this industry and that by 1990 an additional 30,000 jobs would be generated. This represents a total of 49,000 jobs that did not exist in 1977.

The release of this report could not have come at a better time. As we all know, on June 23 a House-Senate conference committee voted to increase the Federal highway tax exemption for fuel ethanol blends from 5 cents per gallon to 6 cents per gallon, effective January 1, 1985. This is legislation which I cosponsored. It is my understanding that Senator Dole used one of the major conclusions of that GAO study when this item was considered; namely, that any revenues lost to the Highway Trust Fund because of the exemption are more than made up through savings in farm support programs and increased tax revenues paid by this growing industry.

Again, Mr. Chairman, all of those in this room can be justly proud of the success of this industry despite many obstacles. According to "Information Resources," a record 424 million gallons of fuel ethanol blends were sold nationally in May 1984, or 4.58 percent of all the gasoline sold in the United States. In some States like Illinois, 10.2 percent of all the gasoline used derived from ethanol blends and in Nebraska it was almost 36 percent.

Thank you, Mr. Chairman. That does conclude my statement.

[The prepared statement of Senator Percy follows:]

STATEMENT OF SENATOR CHARLES H. PERCY AT DECATUR HEARING OF THE HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY, SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT; AND HOUSE COMMITTEE ON AGRICULTURE, SUBCOMMITTEE ON WHEAT SOYBEANS AND FEED GRAINS.

MY NAME IS VINCE MALONEY. I AM HERE TO REPRESENT UNITED STATES SENATOR CHARLES H. PERCY WHO IS IN NORTHERN ILLINOIS THIS MORNING AND UNABLE TO ATTEND THIS IMPORTANT HEARING. THE SENATOR HAS PREPARED THIS STATEMENT, WHICH HE WANTED ME TO READ.

I WOULD LIKE TO COMMEND REPRESENTATIVE RICHARD J. DURBIN FOR SCHEDULING THIS HEARING ON A SUBJECT OF GREAT IMPORTANCE TO ME AND ALL OF ILLINOIS.

IT IS ENTIRELY FITTING THAT THE HEARING IS BEING HELD IN DECATUR. OVER HALF OF THE DOMESTIC FUEL GRADE ETHANOL MARKETED IN THE UNITED STATES IN 1983 WAS PRODUCED WITHIN 100 MILES OF THIS CITY.

MR. CHAIRMAN, ON JUNE 11, I HAD THE DISTINCT HONOR OF BREAKING GROUND FOR THE NEW FUEL ETHANOL PLANT OUTSIDE OF ROCKFORD. THIS PLANT WILL PRODUCE THREE MILLION GALLONS ANNUALLY OF HIGH-GRADE ANHYDROUS ETHANOL FOR BLENDING WITH GASOLINE. ALTHOUGH RELATIVELY SMALL IN SIZE, THIS PLANT WILL EVENTUALLY USE 10 PER CENT OF THE CORN GROWN IN WINNEBAGO COUNTY. IT WILL RESULT IN HIGHER PRICES PAID TO FARMERS AND BENEFIT THE ENTIRE LOCAL ECONOMY.

AT THAT TIME, I RELEASED A UNITED STATES GENERAL ACCOUNTING OFFICE STUDY ON THE FUEL ETHANOL INDUSTRY AND THE NEED TO MAINTAIN FEDERAL TAX INCENTIVES. THERE ARE COPIES OF THE STUDY AVAILABLE HERE THIS MORNING. IF YOU ARE UNABLE TO GET A COPY PLEASE LET VINCE MALONEY KNOW SO THAT IT CAN BE MAILED TO YOU.

IN A NUTSHELL, THE GAO HAS FOUND WHAT I'VE BELIEVED SINCE 1977 WHEN I FIRST INTRODUCED THE ORIGINAL FEDERAL HIGHWAY TAX EXEMPTION FOR FUEL ETHANOL BLENDS, THEN CALLED GASOHOL. NAMELY, THAT IT HAS INCREASED FARM PRICES, CREATED NEW JOBS, AND PROVIDED US WITH AN ALTERNATIVE TRANSPORTATION FUEL IN THE EVENT OF A NATIONAL ENERGY EMERGENCY.

FOR EXAMPLE, IN 1983 WITH SALES OF DOMESTIC PRODUCT OF 375 MILLION GALLONS, THE GAO ESTIMATES THAT CORN PRICES INCREASED 4¢ PER BUSHEL WITH OVERALL FARM PRICES NATIONALLY INCREASING BY $393 MILLION. BY 1990, WITH ANNUAL PRODUCTION OF ONE BILLION GALLONS, CORN PRICES COULD INCREASE BY 15¢ PER BUSHEL AND OVERALL FARM INCOME BY $3.59 BILLION.

THE GAO ALSO FOUND THAT 19,584 JOBS HAD ALREADY BEEN CREATED BY THIS INDUSTRY AND THAT BY 1990 AN ADDITIONAL 30,000 JOBS WOULD BE GENERATED. THIS REPRESENTS A TOTAL OF 49,000 JOBS THAT DID NOT EXIST IN 1977.

THE RELEASE OF THIS REPORT COULD NOT HAVE COME AT A MORE OPPORTUNE TIME. AS WE ALL KNOW, AT 3 A.M. ON JUNE 23, A HOUSE-SENATE CONFERENCE COMMITTEE VOTED TO INCREASE THE FEDERAL HIGHWAY TAX EXEMPTION FOR FUEL ETHANOL BLENDS FROM 5¢ PER GALLON TO 6¢ PER GALLON EFFECTIVE JANUARY 1, 1985. THIS IS LEGISLATION WHICH I CO-SPONSORED. IT IS MY UNDERSTANDING THAT SENATOR DOLE USED ONE OF THE MAJOR CONCLUSIONS OF THE GAO STUDY WHEN THIS ITEM WAS CONSIDERED, NAMELY, THAT ANY REVENUES LOST TO THE HIGHWAY TRUST FUND BECAUSE OF THE EXEMPTION ARE MORE THAN MADE UP THROUGH SAVINGS IN FARM SUPPORT PROGRAMS AND INCREASED TAX REVENUES PAID BY THIS GROWING INDUSTRY.

AGAIN, MR. CHAIRMAN, ALL OF THOSE IN THIS ROOM CAN BE JUSTLY PROUD OF THE SUCCESS OF THIS INDUSTRY DESPITE MANY OBSTACLES. ACCORDING TO INFORMATION RESOURCES, INC., A RECORD 424 MILLION GALLONS OF FUEL ETHANOL BLENDS WERE SOLD NATIONALLY IN MAY, 1984 or 4.58 PER CENT OF ALL THE GASOLINE SOLD IN THE UNITED STATES. IN SOME STATES, LIKE ILLINOIS, 10.2 PER CENT OF ALL THE GASOLINE USED DERIVED FROM ETHANOL BLENDS AND IN
NEBRASKA IT WAS ALMOST 36 PER CENT.

THAT CONCLUDES MY STATEMENT. THANK YOU MR. CHAIRMAN.

July 6, 1984

Mr. DURBIN. Thank you, Mr. Maloney. I want to thank Senator Percy for his work in this area and for submitting a statement this morning, which will become part of the official record.

At this point I would like to call the first panel. This morning we are pleased to have on our opening panel Mr. Bob Schwandt, who is vice president of A.E. Staley Manufacturing Co.; Mr. Jack Reed, vice president of Archer Daniels Midland, both of Decatur, IL; Mr. Al Mavis of ALENCO in Rochester, IL; and Mrs. Kathy Graf with Graf Feed & Fuel Alcohol, Watertown, MN. If those members of the panel would come and join us at the table up here, we would appreciate it very much.

Prior to beginning with this panel, I would first like to apologize to Mrs. Graf for mispronouncing her name. I hope not to make that mistake again. And I would like to welcome your husband, Mr. Rudiger Graf, who is joining you here today.

We are going to leave the record open at this hearing, with the indulgence of my colleague, Mr. Skeen, for 2 weeks for anyone interested in submitting any written testimony to become part of the official transcript. Any problems with that, Joe?

Mr. SKEEN. I have no problems with that.

Mr. DURBIN. We also have advised our witnesses, who have virtually all presented us with written statements, that we would appreciate it very much if they would attempt to summarize those statements to a 5- or 10-minute presentation. The total statement they are going to make will be made a part of the official record. That will give us some time for questions.

I would like at this point to recognize for his comments Mr. Bob Schwandt of A.E. Staley.

STATEMENTS OF W.R. SCHWANDT, VICE PRESIDENT AND GENERAL MANAGER, ETHANOL BUSINESS UNIT, A.E. STALEY MANUFACTURING CO., DECATUR, IL; JACK REED, VICE PRESIDENT, ARCHER DANIELS MIDLAND CO., DECATUR, IL; AL MAVIS, ALENCO, ROCHESTER, IL; RUDIGER GRAF AND KATHERINE GRAF, GRAF FEED & FUEL ALCOHOL, WATERTOWN, MN

Mr. SCHWANDT. Thank you.

Mr. Chairman, ladies and gentlemen, my name is W. Robert Schwandt and I am vice president and general manager of the ethanol business unit at Staley Manufacturing Co. here in Decatur.

Mr. DURBIN. Bob, could you move the microphone a little closer to you, the black one.

Mr. SCHWANDT. One would expect a high degree of interest and understanding of agriculture from an Illinois Congressional delegation, but we are especially fortunate that our delegation has also distinguished itself with its knowledge of the complex relationship between agriculture, the energy consumer and agriculture, and the inexhausible source of renewable fuels. We owe a vote of thanks to Senators Percy and Dixon and to our Decatur area Congressmen, Durbin and Michel, for their understanding and support.

In 1979, the United States was dependent upon imports for over half of our petroleum requirements. By 1983, this had been reduced to about 34 percent. The downward trend has now been reversed with our improving economy, and recent figures are near 40 per-

cent. The expected $60 billion bill for 1984 petroleum imports will be a major contributor for our growing international trade deficit.

The past 3 years have set an all time high in oil and gas drilling activity. A rate of over 80,000 wells per year has been sustained at an annual cost of over $24 billion. This feverish activity has failed to offset depletion. Production in 1984 will be below the 1977-78 average, and our proven reserves continue to dwindle. Our shortfall, now slightly over 5 million barrels per day, is expected to increase sharply over the next decade. Alternative sources of energy must be developed and expanded over this period.

The strategic importance of a fuel production system dispersed throughout the heartland of the United States should not be underestimated. In the case of a national emergency, our midcontinent oil refineries should be able to concentrate on increased yields of priority fuels while ethanol provides the octane for motor gasoline.

The price of crude oil increased from $3 to $34 per barrel in less than a decade. As world demand expands and reserves dwindle, oil prices will again increase at a rate in excess of overall inflation. Our supplies of renewable sources will be growing, new technology will be reducing costs, and just as the cost of grain has decreased in constant dollars over this period, so will the price of renewable and alternative fuels relative to petroleum. This long-term trend clearly points to an economically viable fuel ethanol industry.

There are currently nine large-scale ethanol plants in operation in the United States. Competition for cost and quality leadership is fierce, and each new plant advances the state of the art. Yeilds, energy consumption, labor application and byproducts recoveries continue to improve.

At one time, beverage alcohol plants consumed more energy than the fuel value of the ethanol produced. Our modern distillation plants can go from beer to anhydrous alcohol with a consumption of less than 20,000 BTU's per gallon, and they will continue to improve. Several approaches to continuous fermentation have been successful, these resulting in increased yields of ethanol. Research into improved fermentation methods is progressing rapidly, and the next generation of conversion of cellulosics such as wood chips to liquid fuels continues to receive industrial and academic attention.

Ethanol is the only completely environmentally benign octane enhancer now available. Tests by the EPA show that ethanol-enriched gasoline results in reduced emissions of hydrocarbons, carbon monoxide, and nitrogen oxides. The traditional lead-ethylene dibromide mixture is now recognized as hazardous to health, particularly in large cities, where there is evidence of permanent brain damage to children subjected to the lead in automobile fumes. Unleaded gasoline also contains up to 30 percent of aromatic reformates, which include benzene, a known carcinogen.

The U.S. automobile fleet has been converting to unleaded gasoline since 1974. The current market share for unleaded gasoline, based on the automobile population, should be close to 70 percent. However, the inadequate antiknock performance of regular unleaded gasoline and the average price differential of close to 7 cents per gallon has encouraged motorists to violate the law and misfuel unleaded vehicles with leaded gasoline. The low cost availability of

ethanol as an octane enhancer will reduce the performance incentive to misfuel.

The recent introduction of House bill 5727 by Congressman Durbin provides a means to eliminate this financial incentive. This bill proposes a 2 cents a gallon tax on leaded fuel, an amount sufficient to largely offset the wholesale differential in leaded versus unleaded gasoline prices. With this differential eliminated, there is much less incentive for retail marketers to "loss lead" with leaded regular. This bill could thus have a significant impact on the unlawful use of leaded fuel for which there is at this time no other feasible enforcement procedure. Further, the revenue generated from this tax could largely eliminate the problems now associated with the 5 cent, soon to be 6 cent, gasohol exemption from the Federal motor fuel tax.

Mr. Chairman, thank you for coming to Decatur and giving us this opportunity to testify.

[The prepared statement of Robert Schwandt follows:]

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TESTIMONY OF W. R. SCHWANDT BEFORE THE SUBCOMMITTEE ON INVESTIGATIONS OF OVERSIGHT - U. S. HOUSE OF REPRESENTATIVES DECATUR, ILLINOIS - JULY 6, 1984

The great oil supply shocks of 1974 and 1979 are no longer matters of public concern. We believe that the current complacency about the so-called oil glut is unjustified.

In 1979, the United States was dependent upon imports for over half of our petroleum requirements. By 1983 this dependency had been reduced to about 34%. The trend has now been reversed with the improving economy, and recent figures are near 40%. The expected $60 billion bill for 1984 petroleum imports will be a major contributor to our growing international trade deficit.

The past three years have set an all time high in oil and gas drilling activity. A rate of over 80,000 wells per year has been sustained at an annual cost of over $24 billion. This feverish activity has failed to offset depletion. Production for 1984 is below the 1977-78 average and our proven reserves continue to dwindle. Thus, our shortfall, now slightly over 5 million barrels per day, is expected to increase sharply over the next decade. Alternative sources of energy must be developed and expanded over this period.

The strategic importance of a fuel production system dispersed throughout the heartland of the United States should not be underestimated. In the case of a national emergency, midcontinent refineries will be able to concentrate on increased yields of priority fuels while ethanol provides the octane for motor gasoline.

The price of crude oil increased from $3.00 to $34.00 per barrel in less than a decade. As world demand expands, and reserves dwindle, prices will again increase at a rate in excess of overall inflation. Our supplies of renewable sources will be growing, new technology will be reducing costs, and just as the cost of corn has decreased in constant dollars over this period, so will the price of renewable and alternative fuels relative to petroleum. This long-term trend clearly points to an economically viable fuel ethanol industry.

The impact of ethanol production on the American agricultural economy is much more visible, even in the short-term. Our industry capacity is now approaching 500 million gallons per year and will utilize 200 million bushels of corn, a quantity roughly equivalent to our exports to Russia, with the added advantages of a steady 365-day per year demand and a domestic value added industry.

There are currently nine plants operating at 20 million gallons per year, or larger. Competition for cost and quality leadership is fierce, and each new plant advances the state-of-the-art. Yields, energy consumption, labor application and by-products recoveries continue to improve.

At one time, beverage alcohol plants consumed more energy than the fuel value of the alcohol produced. Modern distillation plants can go from beer to anhydrous alcohol with a consumption of less than 20,000 BTU's per gallon. Several approaches to continuous fermentation have been successful, resulting in increased yields of ethanol. Research into improved fermentation methods is progressing rapidly in academic, industrial and government laboratories. The next generation of conversion of cellulosics such as wood chips to liquid fuels continues to receive industrial and academic attention, particularly in the Ag schools of the deep south.

Ethanol is the only completely environmentally benign octane enhancer now available. Tests by the EPA show that ethanol enriched gasoline results in reduced emissions of hydrocarbons, carbon monoxide and nitrogen oxides. The traditional lead-EDB mixture is now recognized as hazardous to health, particularly in large cities where there is evidence of permanent brain damage to children subjected to the lead in automobile fumes. Unleaded gasoline also contains up to 30% of aromatic reformates, including benzene, a know carcinogen.

The United States auto fleet has been converting to unleaded gasoline since 1974. The current market share for unleaded gasoline should be close to 70%. However, the inadequate antiknock performance of regular unleaded gasoline and the average price differential of 7¢ per gallon has encouraged motorists to violate the law and misfuel unleaded vehicles with leaded gasoline. The low cost availability of ethanol as an octane enhancer reduces the performance incentive to misfuel.

The recent introduction of HR 5727, by Representative Dick Durbin, provides a means to eliminate the financial incentive. This Bill proposes a 2¢ per gallon tax on leaded fuel, an amount sufficient to largely offset the wholesale differential in leaded versus unleaded gasoline prices. With this differential eliminated, there is much less incentive for retail marketers to "loss lead" with leaded regular. This Bill could thus have a significant impact on the unlawful use of leaded fuel for which there is at this time no other feasible enforcement procedure. Further, the revenue generated from this tax could largely eliminate the problems now associated with the 6¢ gasohol exemption from the federal motor fuel tax.

Attachments

W. R. Schwandt is Vice President and General Manager of Ethanol at the A. E. Staley Manufacturing Company. His career there has included process development, plant design and operation in wet corn milling, enzyme production and fuel ethanol. He is currently Chairman of the Board of Directors of the Renewable Fuels Association.

TABLE I

U. S. Production and Imports Petroleum

	Domestic Crude Oil Production (MMB/Day)	Imports Crude & Refined Products (MMB/Day)	Value of Imports ($ Billion)
1973	9.21	6.26	7
1974	8.77	6.11	25
1975	8.38	6.06	28
1976	8.13	7.31	36
1977	8.75	8.81	47
1978	8.71	8.36	45
1979	8.55	8.46	63
1980	8.60	6.91	83
1981	8.57	6.00	81
1982	8.67	5.04	65
1983	8.68	4.98	55
1984 (E)	8.65	5.50	60

Source: U. S. Energy Information Administration

TABLE II

Domestic Drilling Activity And Proved Reserves

Year	Wells Drilled (x 1000)	Reserves (Billions/bbl)
1971	25	39
1972	27	38
1973	26	36.5
1974	32	35.5
1975	38	34
1976	39	33
1977	45	31
1978	47	29.5
1979	50	28
1980	61	27
1981	80	26.5
1982	88	25
1983	79	24.5

Source: Data from Oil and Gas Journal (A.P.I.)

TABLE III

Imports Motor Gasoline

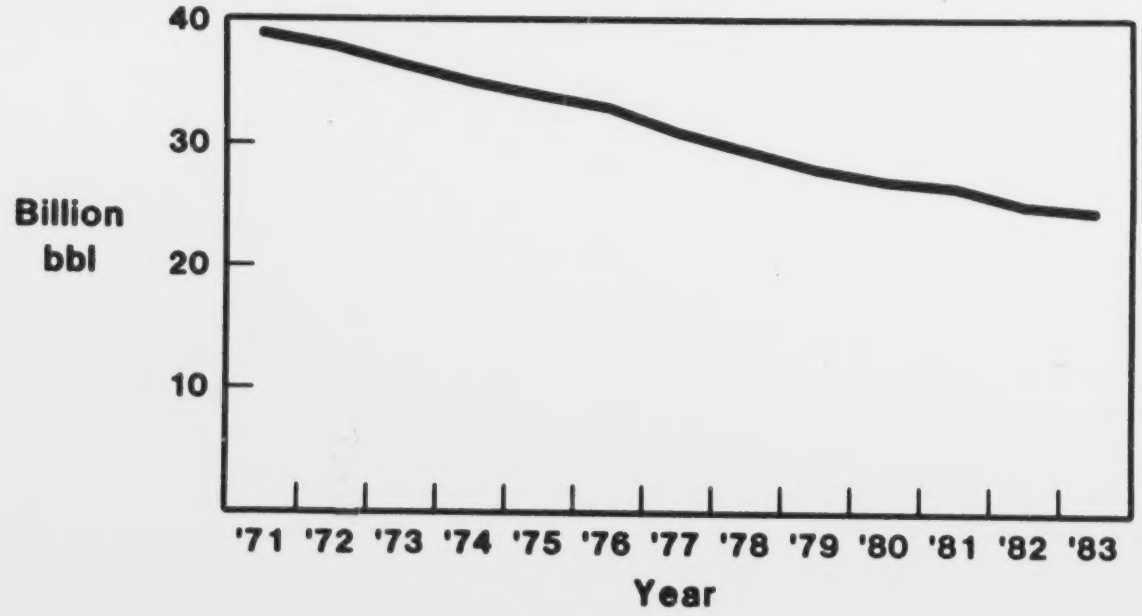
Thousand Barrels Per Day

Annual Rates - January - June (6 Mo.)

1979	178
1980	147
1981	170
1982	174
1983	220
1984	283

Source: E.I.A. - Weekly Petroleum Status Report

DOMESTIC RESERVES



Mr. DURBIN. Thank you very much, Bob.

At this time I would like to recognize Mr. Jack Reed, vice president of Archer Daniels Midland. Jack.

Mr. REED. Thank you, Congressman Durbin.

At the outset I would like to echo my colleague, Bob Schwandt, by acknowledging the major contributions that have been made to the fuel ethanol industry by Congressmen Durbin and Michel and Senators Percy and Dixon.

My name is Jack Reed. I am vice president, international, of Archer Daniels Midland Co. here in Decatur. I would like to thank you for the opportunity to discuss technological developments within the fuel alcohol industry. The Archer Daniels Midland Co. is an agricultural processing firm with corporate headquarters here in Decatur. ADM is involved in the acquisition, storage, transportation and processing of a large number of grains and oil seeds.

As a major producer of high fructose corn sweeteners, the company has operated corn wet milling facilities since 1972. In 1977 the company opened the first new distillery in the United States in nearly 20 years at our Decatur location. At the time of construction, that facility employed highly sophisticated electronic controls. However, the basic fermentation technology was essentially unchanged from previous decades of potable alcohol production. While the plant was designed to produce both beverage and industrial ethanol, the company noted in its 1976 annual report that energy price increases could one day lead to the use of ethanol as a fuel additive.

In June 1978, the State of Iowa approached ADM to supply a limited amount of ethanol for a test marketing program of what was then called "gasohol." Since that time, changes in petroleum prices, increasing octane needs in gasoline, and the establishment of a clear national policy toward alternative fuels development have resulted in the expansion of fuel ethanol on a national basis. ADM has participated in that expansion by converting the Decatur facility to fuel ethanol production and expanding its capacity.

Additionally, the company has added alcohol to the Cedar Rapids, IA, plant and has expanded alcohol production in Peoria, IL. Currently, ADM has the capacity to produce approximately 300 million gallons of ethanol annually. However, the company's Peoria operation is presently shut down due to economic constraints, the primary constraint being the high price of corn resulting from last year's PIK Program and drought.

As I mentioned earlier, when the Decatur ethanol plant was constructed, it employed state-of-the-art technology. However, it is important to recognize that the advent of fuel ethanol really signaled the introduction of a new product. Unlike previous fermentation objectives, fuel fermentation produces a product in which color, taste, and smell are not significant factors. Therefore, the elimination of previous constraints on technology because of the quality factors required in the end product offer potentially new technological opportunities in this industry.

The technology employed in our current operations is quite different from the technology of 6 years ago. Among the innovations incorporated are continuous train fermentation, significantly enhanced distillation, sharply reduced production time, and substan-

tial energy efficiency gains. Specifically, new yeast strains and the development of a continuous process have caused fermentation time to be reduced to one-third the previous time, and the Btu's for production have been cut to one-seventh of the original requirements per gallon. It is worth noting that in 1983 the USDA and the Department of Energy issued a joint release which showed their findings of the energy efficiency of fuel alcohol production to be at least 1.5 to 1 in favor of alcohol. ADM's own numbers today would actually be far better than this.

These innovations have occurred in only 5 years, but more importantly, they represent the ability of American industry to respond to the demands of market pullthrough the development of more efficient technology. The result is best exemplified by a simple comparison.

In 1978, when ADM supplied Iowa's original test market, alcohol sold in the range of $1.50 per gallon, while gasoline at that time was about 35 cents per gallon. Today, gasoline prices have receded from their high of over $1 per gallon at the wholesale level to the current range of 70 to 80 cents per gallon, and yet fuel alcohol is still selling in the range of $1.50 per gallon.

While no one can say what specific technological advancements will occur in the next 5 years, or what might happen to gasoline prices, the incentive for improved technology exists. New distillation technology, newer yeasts and better enzymes are all being worked on.

It is clear that the industry's development to date has been the result of a long-term commitment of U.S. policy to assist alcohol fuels in achieving their full potential contribution to the U.S. economy. This policy is best exemplified by the recent 1 cent increase in the Federal alcohol fuels tax exemption as part of the Budget Reduction Act of 1984. Other steps taken by the Government include special investment tax credits and research and development of new technologies by the U.S. Departments of Energy and Agriculture.

As a side note, an early concern about fuel ethanol was the question of utilizing grain for fuel rather than for food and feed. That actually is somewhat of a misstatement of the issue, because it should be noted that fuel ethanol is produced from corn only after 1.7 pounds of edible corn oil, 12.5 pounds of 21 percent protein gluten feed, and 3 pounds of 60 percent protein gluten meal have been extracted and have been thereby returned to the food and feed chain. In addition, at our Decatur facility over 20,000 heads of fresh lettuce are harvested daily as a result of alcohol production. The low grade heat and carbon dioxide produced in the alcohol process provide all the heat and a growth stimulant for the hydrophonics operation. As an example of the food efficiency of our operations, at capacity, over 200 million pounds per year of corn oil would enter the food chain that would otherwise have been fed to livestock.

The market for fuel ethanol has also experienced significant changes. The term "gasohol" was originally used to differentiate ethanol blends from gasoline and ethanol's primary attribute originally was its 10-percent extension capability during periods of fuel shortage. Today, ethanol is a recognized octane booster used to

produce high octane gasolines. While it will always be an extender in times of shortage, it's octane boosting qualities have clearly established its value in the market as well as at the refinery for producing high octane unleaded fuels and as an environmentally beneficial alternative to tetraethyl lead.

This acceptance by the petroleum industry has been made possible by the singular fact that the fuel works. Ethanol blends have been approved by the Environmental Protection Agency, and 10 percent blends have received warranty approval from virtually every major domestic and foreign auto manufacturer marketing automobiles in the United States. This acceptance will result in the marketing of nearly 500 million gallons of ethanol in 1984, requiring nearly 200 million bushels of U.S. corn, which is nearly equal to the entire Soviet market for U.S. corn.

As mentioned previously, ADM operates alcohol facilities in Decatur, IL, Peoria, IL, and Cedar Rapids, IA. In addition, our corn wet milling facilities in Clinton, IA, and Montezuma, NY, offer the potential for the addition of ethanol plants. Should the economics of ethanol production warrant, the company is ready to add fuel ethanol to those facilities and could increase its total capacity by as much as 50 percent.

While marketplace and technological developments have allowed the industry to make a significant contribution to the agricultural and overall economy of the United States, the industry's future is somewhat clouded by the overhanging presence of highly subsidized Brazilian alcohol which is subsidized even further to overcome U.S. public policy support for domestic production.

In reality, the threat posed to U.S. fuel ethanol by subsidized imports from Brazil can be traced in large part to the European Economic Community. While we provide costly defense support to the European community with U.S. dollars, the EEC diverts their economic resources to finance massive farm subsidies, including a program under which they pay farmers 27 cents per pound to produce sugar and then turn around and subsidize the export of over 4 million tons of sugar to world markets at a current price level of 5 cents per pound. The impact of these subsidized sugar exports is to smash the economies of sugar-producing developing nations, many of which are former European colonies who must export their sugar in competition with European community sugar at about one-quarter of their actual cost of production.

As a result, Brazil is transforming massive amounts of sugar produced with their own subsidies into alcohol. It is really a three-stage subsidizing process. Brazil initially subsidizes the production of large quantities of sugar. They then subsidize the conversion of their surplus sugar into alcohol, and they then subsidize the export of part of that alcohol to world markets, including the United States.

With below market rate loans from Western banks and the World Bank, Brazilian distilleries are constructed and exports are subsidized. The alcohol produced is being shipped to the United States at a price which would require 70 cents per bushel corn to compete in the U.S. market. We are greatly concerned that some people in the United States suggest that supporting Brazilian imports of alcohol in direct competition with U.S. production is in the

best interest of the United States. It appears that people that hold this view are looking at Brazil's very large debt and at the need for Brazil to earn foreign exchange to pay interest to U.S. banks. But, in reality, by supporting the import of subsidized Brazilian alcohol, it is the Illinois corn producer that will be paying the interest to the U.S. banks.

From a national security standpoint, U.S. ethanol provides a fuel which cannot be embargoed. During the last Arab oil embargo, the Brazilian Government embargoed the exporting of their ethanol. It should also be noted that while the Brazilians question our policies, they themselves have a 160 percent ad valorem tax on imported ethanol, and in recent times they have totally prohibited ethanol imports.

The ultimate resolution of this problem of subsidized imports will play a major role along with the overall economics of ethanol as to what, if any, growth limitations this industry will face.

Thank you.

[The prepared statement of Jack Reed follows:]

I'D LIKE TO THANK YOU FOR THE OPPORTUNITY TO SPEAK WITH YOU TODAY ABOUT THE TECHNOLOGICAL DEVELOPMENTS WITHIN THE FUEL ALCOHOL INDUSTRY. THE ARCHER DANIELS MIDLAND COMPANY IS AN AGRICULTURAL PROCESSING FIRM WITH CORPORATE HEADQUARTERS IN DECATUR, ILLINOIS. THE COMPANY IS INVOLVED IN THE ACQUISITION, STORAGE, TRANSPORTATION AND PROCESSING OF A VARIETY OF AGRICULTURAL COMMODITIES.

AS A MAJOR PRODUCER OF HIGH FRUCTOSE CORN SWEETENERS, THE COMPANY HAS OPERATED CORN WET MILLING FACILITIES SINCE 1972. IN 1977 THE COMPANY OPENED THE FIRST NEW DISTILLERY IN THE U.S. IN NEARLY 20 YEARS AT OUR DECATUR, ILLINOIS LOCATION. AT THE TIME OF CONSTRUCTION, THE FACILITY EMPLOYED HIGHLY SOPHISTICATED ELECTRONIC CONTROLS, HOWEVER THE BASIC FERMENTATION TECHNOLOGY WAS ESSENTIALLY UNCHANGED FROM DECADES OF POTABLE ALCOHOL PRODUCTION. WHILE THE PLANT WAS DESIGNED TO PRODUCE BEVERAGE AND INDUSTRIAL ETHANOL, THE COMPANY NOTED IN ITS 1976 ANNUAL REPORT THAT ENERGY PRICE INCREASES COULD ONE DAY LEAD TO THE USE OF ETHANOL AS A FUEL ADDITIVE.

IN JUNE OF 1978, THE STATE OF IOWA APPROACHED THE COMPANY TO SUPPLY A LIMITED AMOUNT OF ETHANOL FOR A TEST MARKETING PROGRAM OF "GASOHOL". SINCE THAT TIME, CHANGES IN PETROLEUM PRICES, INCREASING OCTANE NEEDS IN GASOLINE AND THE ESTABLISHMENT OF A CLEAR NATIONAL POLICY TOWARD ALTERNATIVE FUELS DEVELOPMENT HAVE RESULTED IN THE EXPANSION OF FUEL ETHANOL ON A NATIONAL BASIS. ADM HAS PARTICIPATED IN THAT EXPANSION BY CONVERTING THE DECATUR

FACILITY TO FUEL ETHANOL PRODUCTION AND EXPANDING ITS CAPACITY. ADDITIONALLY, THE COMPANY HAS ADDED ALCOHOL TO THE CEDAR RAPIDS, IOWA PLANT AND HAS EXPANDED PRODUCTION IN PEORIA, ILLINOIS. CURRENTLY THE COMPANY HAS A CPACITY TO PRODUCE 300 MILLION GALLONS OF ETHANOL ANNUALLY, HOWEVER THE COMPANY'S PEORIA OPERATION IS SHUT DOWN DUE TO ECONOMIC CONSTRAINTS.

AS I MENTIONED EARLIER, WHEN THE DECATUR ETHANOL PLANT WAS CONSTRUCTED, IT EMPLOYED STATE-OF-THE-ART TECHNOLOGY. HOWEVER, IT IS IMPORTANT TO RECOGNIZE THAT THE ADVENT OF "FUEL ETHANOL" SIGNALED THE INTRODUCTION OF A NEW PRODUCT. UNLIKE PREVIOUS FERMENTATION OBJECTIVES, FUEL FERMENTATION PRODUCES A PRODUCT IN WHICH COLOR, TASTE AND SMELL ARE NOT SIGNIFICANT FACTORS. THEREFORE, PREVIOUS CONSTRAINTS ON TECHNOLOGY BECAUSE OF THE UNACCEPTABILITY OF THE END PRODUCT OFFERED POTENTIALLY NEW TECHNOLOGIES IN THIS INDUSTRY.

IN OUR CURRENT OPERATIONS, THE TECHNOLOGY DOES NOT CLOSELY RESEMBLE THE TECHNOLOGY OF 6 YEARS AGO. AMONG THE INNOVATIONS INCORPORATED ARE CONTINUOUS TRAIN FERMENTATION, SIGNIFICANTLY ENHANCED DISTILLATION, SHARPLY REDUCED PRODUCTION TIME AND SUBSTANTIAL ENERGY EFFICIENCY GAINS. SPECIFICALLY, NEW YEAST STRAINS AND THE CONTINUOUS PROCESS HAVE CAUSED FERMENTATION TIME TO BE REDUCED TO 1/3 THE PREVIOUS TIME, AND THE BTUS REQUIRED FOR PRODUCTION HAVE BEEN CUT TO 1/7 OF THE ORIGINAL REQUIREMENTS PER GALLON. IT IS WORTH NOTING THAT IN 1983 THE USDA AND DOE ISSUED A JOINT RELEASE WHICH SHOWED THEIR FINDINGS OF THE ENERGY EFFICIENCY OF FUEL

ETHANOL PRODUCTION TO BE AT LEAST 1.5 TO 1 IN FAVOR OF ALCOHOL. OUR OWN NUMBERS TODAY WOULD ACTUALLY BE FAR GREATER THAN THIS.

THESE INNOVATIONS HAVE OCCURED IN ONLY 5 YEARS BUT MORE IMPORTANTLY, THEY REPRESENT THE ABILITY OF AMERICAN INDUSTRY TO RESPOND TO THE DEMANDS OF MARKET PULL THROUGH THE DEVELOPMENT OF MORE EFFICIENT TECHNOLOGY. THE RESULT IS BEST EXEMPLIFIED BY A SIMPLE COMPARISON.

IN 1978 WHEN ADM SUPPLIED IOWA'S TEST MARKET, ALCOHOL SOLD IN THE $1.50 PER GALLON RANGE, GASOLINE WAS $0.35. WHILE GASOLINE TODAY HAS FALLEN FROM ITS HIGH IN EXCESS OF $1.00 PER GALLON WHOLESALE TO CURRENT LEVELS OF 70-80¢, ALCOHOL IS STILL IN THE $1.50 PER GALLON RANGE.

WHILE NO ONE CAN SAY WHAT SPECIFIC TECHNOLOGICAL ADVANCEMENTS WILL OCCUR IN THE NEXT 5 YEARS OR WHAT MIGHT HAPPEN TO GASOLINE PRICES, THE INCENTIVE FOR IMPROVED TECHNOLOGY EXISTS. NEW DISTILLATION TECHNOLOGY, NEWER YEASTS AND ENZYMES ARE ALL BEING WORKED ON.

IT IS CLEAR, THAT THE INDUSTRY DEVELOPMENT TO DATE HAS BEEN THE RESULT OF A LONG-TERM COMMITMENT OF U.S. POLICY TO ASSIST ALCOHOL FUELS IN ACHIEVING THEIR FULL POTENTIAL CONTRIBUTION TO THE U.S. ECONOMY. THIS POLICY IS BEST EXEMPLIFIED BY THE RECENT 1¢ INCREASE IN THE FEDERAL ALCOHOL FUELS EXEMPTION AS PART OF THE BUDGET REDUCTION ACT OF 1984. OTHER STEPS TAKEN BY THE GOVERNMENT INCLUDE SPECIAL INVESTMENT TAX CREDITS AND RESEARCH AND DEVELOPMENT OF NEW

TECHNOLOGIES BY THE U.S. DEPARTMENTS OF ENERGY AND AGRICULTURE.

AS A SIDE NOTE, AN EARLY CONCERN ABOUT FUEL ETHANOL WAS THE QUESTION OF FOOD VERSUS FUEL. IT SHOULD BE NOTED THAT FUEL ETHANOL IS PRODUCED FROM CORN ONLY AFTER 1.7 POUNDS OF EDIBLE CORN OIL, 12.5 POUNDS OF 21% PROTEIN GLUTEN FEED AND 3 POUNDS OF 60% PROTEIN GLUTEN MEAL, WHICH IS ENOUGH PROTEIN TO RAISE 3 CHICKENS TO MARKET, HAS BEEN REMOVED AND RETURNED TO THE FOOD AND FEED CHAIN. IN ADDITION, AT OUR DECATUR FACILITY OVER 20,000 HEADS OF FRESH LETTUCE ARE HARVESTED DAILY AS A RESULT OF ALCOHOL PRODUCTION. THE LOW GRADE HEAT AND CARBON DIOXIDE PRODUCED IN THE ALCOHOL PROCESS PROVIDE ALL THE HEAT AND A GROWTH STIMULANT FOR THE HYDROPONICS OPERATION. AS AN EXAMPLE OF THE FOOD EFFICIENCY OF OUR OPERATIONS, AT CAPACITY, OVER 200 MILLION POUNDS OF CORN OIL WOULD ENTER THE FOOD CHAIN EACH YEAR THAT WOULD OTHERWISE HAVE BEEN FED TO LIVESTOCK.

THE MARKET FOR FUEL ETHANOL HAS ALSO EXPERIENCED SIGNIFICANT CHANGES. "GASOHOL" WAS ORIGINALLY USED TO DIFERENTIATE ETHANOL BLENDS FROM GASOLINE AND ETHANOL'S PRIMARY ATTRIBUTE WAS ITS 10% EXTENSION CAPABILITY DURING FUEL SHORTAGES. TODAY ETHANOL IS A RECOGNIZED OCTANE BOOSTER USED TO PRODUCE HIGH OCTANE GASOLINES. WHILE IT WILL ALWAYS BE AN EXTENDED IN TIMES OF SHORTAGE, ITS OCTANE BOOSTING QUALITIES HAVE CLEARLY ESTABLISHED ITS VALUE IN THE MARKET AS WELL AS AT THE REFINERY FOR PRODUCING HIGH OCTANE UNLEADED FUELS AND AS AN ENVIRONMENTALLY BENIGN ALTERNATIVE TO TETRA ETHYL LEAD.

THIS ACCEPTANCE BY THE PETROLEUM INDUSTRY HAS BEEN MADE POSSIBLE BY THE SINGULAR FACT THAT THE FUEL WORKS. ETHANOL BLENDS HAVE BEEN APPROVED BY THE ENVIRONMENTAL PROTECTION AGENCY AND 10% BLENDS HAVE RECEIVED WARRANTY APPROVAL FROM VIRTUALLY EVERY MAJOR DOMESTIC AND FOREIGN AUTO MANUFACTURER MARKETING AUTOMOBILES IN THE U.S. THIS ACCEPTANCE WILL RESULT IN THE MARKETING OF NEARLY 500 MILLION GALLONS OF ETHANOL IN 1984 REQUIRING NEARLY 200 MILLION BUSHELS OF U.S. CORN, NEARLY EQUAL TO THE SOVIET MARKET FOR CORN.

AS MENTIONED PREVIOUSLY, ADM OPERATES ALCOHOL FACILITIES IN DECATUR, ILLINOIS, PEORIA, ILLINOIS AND CEDAR RAPIDS, IOWA. IN ADDITION, CORN WET MILLING FACILITIES IN CLINTON, IOWA AND MONTEZUMA, NEW YORK OFFER THE POTENTIAL FOR THE ADDITION OF ETHANOL PLANTS. SHOULD THE ECONOMICS OF ETHANOL PRODUCTION WARRANT, THE COMPANY IS READY TO ADD FUEL ETHANOL TO THOSE FACILITIES AND COULD INCREASE TOTAL CAPACITY BY AS MUCH AS 50%.

WHILE MARKET PLACE AND TECHNOLOGICAL DEVELOPMENTS HAVE ALLOWED THE INDUSTRY TO MAKE A SIGNIFICANT CONTRIBUTION TO THE AGRICULTURAL AND OVERALL ECONOMY OF THE U.S., THE INDUSTRY FUTURE IS CLOUDED BY THE OVERHANGING PRESENCE OF HIGHLY SUBSIDIZED BRAZILIAN ALCOHOL WHICH IS SUBSIDIZED EVEN FURTHER TO OVERCOME U.S. PUBLIC POLICY SUPPORT FOR DOMESTIC PRODUCTION.

IN REALITY, THE THREAT ON U.S. ETHANOL CAN BE TRACED TO THE EEC. WHILE WE PROVIDE COSTLY DEFENSE SUPPORT TO EUROPE WITH U.S. DOLLARS, THE EEC DIVERTS THEIR RESOURCES TO FINANCE MASSIVE FARM

SUBSIDIES SUCH AS PAYING FARMERS 27¢ PER POUND TO PRODUCE SUGAR AND THEN SUBSIDIZE ITS EXPORT FORCING WORLD PRICES DOWN TO 5¢ PER POUND. THE IMPACT IS TO SMASH THE ECONOMIES OF DEVELOPING NATIONS, MANY OF WHICH ARE FORMER EUROPEAN COLONIES WHO MUST EXPORT THEIR SUGAR IN COMPETITION WITH EEC SUGAR AT 1/4 THE ACTUAL COST OF PRODUCTION.

AS A RESULT, BRAZIL IS TRANSFORMING MASSIVE AMOUNTS OF SUGAR PRODUCED WITH THEIR OWN SUBSIDIES INTO ALCOHOL. WITH BELOW MARKET RATE LOANS FROM WESTERN BANKS AND THE WORLD BANK, BRAZILIAN DISTILLERIES ARE CONSTRUCTED AND EXPORTS ARE SUBSIDIZED. THE ALCOHOL PRODUCED IS BEING SHIPPED TO THE U.S. AT A PRICE WHICH WOULD REQUIRE 70¢ PER BUSHEL CORN TO COMPETE IN THE U.S. MARKET. WHAT IS CONCERNING IS THAT SOME PEOPLE IN THE U.S. SUGGEST THAT SUPPORTING BRAZILIAN IMPORTS OF ALCOHOL IN DIRECT COMPETITION WITH U.S. PRODUCTION IS IN THE BEST INTEREST OF THE U.S.

FROM A NATIONAL SECURITY STANDPOINT, U.S. ETHANOL PROVIDES A FUEL WHICH CANNOT BE EMBARGOED. DURING THE LAST ARAB OIL EMBARGO THE BRAZILIAN GOVERNMENT EMBARGOED THE EXPORTING OF THEIR ETHANOL. IT SHOULD ALSO BE NOTED THAT WHILE THE BRAZILIANS QUESTION OUR POLICIES, THEY HAVE A 160% ADVALOREM TAX ON IMPORTED ETHANOL AND IN RECENT TIMES THEY HAVE TOTALLY PROHIBITED ETHANOL IMPORTS.

THE ULTIMATE RESOLUTION OF THIS PROBLEM WILL PLAY A MAJOR ROLE ALONG WITH THE OVERALL ECONOMICS OF ETHANOL AS TO WHAT IF ANY GROWTH LIMITATIONS THIS INDUSTRY WILL FACE.

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Mr. DURBIN. Jack, thank you very much.

At this point I would like to introduce a fellow Sangamon County resident and neighbor of mine from Rochester, Al Mavis, who is with the ALENCO energy company. I would say, in preface to Al's remarks, that he is one of the local pioneers in the ethanol industry and I think has been probably one of its strongest advocates from the beginning.

Al, I have reviewed your statement here. It's excellent. I would like at this point to introduce you and allow you to make some remarks for the committees' edification.

Mr. MAVIS. Thanks, Dick. I'm not much on reading, as you people will find out. You'll have to get it and pick it up and read it. But I would like to talk just a little bit about the situation.

I want to thank the Congressmen for coming to Decatur, where this thing really takes place, and most of all, to thank Bob and Jack for what these two large companies have done to make the thing possible. It would not have been possible—we in agriculture would still be out there scratching our way around like most of us are had not these giants began to recognize what they could really do for the country and for American agriculture.

I've got some real problems, Dick, in this thing. I go back to when we brought Secretary Duncan to Decatur in 1978, and Bob was the master of ceremonies when we sat down with all the wet millers to talk about the potential of this thing. It's been a long time, Bob. And Secretary Duncan that day said that "Having seen what I've seen in Illinois today, we can have 500 million gallons of ethanol by 1982."

We almost made it. We would have made it with proper leadership out of Washington. I'm really concerned that you people as a committee have got a real job to do back with the administration. I don't care how you come here and how excited we get you in what you see today that's taking place, but Washington is really standing on top of a good thing and they haven't given us much support, even the ag department or the science department on this thing.

So I go back to what we're doing, and we have come a long way. But we've come a long way dragging the USDA and the DOE and I think the administration. I think those are some things you people have got to be aware of, that you haven't done this thing easy. It's done with guts.

I go back to thinking about some of the things. I see Marlyn Herman who is sitting in the crowd, who was the first girl in the Department of Energy who really listened about ethanol, and it was so treacherous in those days to talk about it in the Department of Energy that Marlyn and I used to meet in the streets and under the trees. They didn't want to see me in the office because I was "verbotten". I don't think times have changed very much. The Department of Energy I think is going to talk here later today, and I hope the gentleman is here because I haven't seen any response out of them that indicated they understand alcohol.

Anyhow, let's talk about USDA. The USDA had a 4 million bushel test program. It was a total disaster. They put out an opportunity for plants to bid on 4 million bushel of off-grade grain and had no idea what you were going to get, but you had to guarantee them how much alcohol you were going to make out of it and how

much you would going to get paid for doing the work. It was a disaster. It led almost in every case, except one, that I know of, not only to the ruin of the program but it destroyed the plants and the plant operators that were involved in it. A serious situation.

They came along with a Farmers Home Loan Program, and I only know of one loan that was really closed under the guarantee loan program. The rest of them have failed miserably. And when they went down, instead of making some attempt to bring in another $300,000 or $400,000 or whatever it took, and save the industry and save the community, they asked the plants be put up for salvage, and not only did it destroy the plants and the community and activity but it destroyed the farmers who had put their names on the line. These are serious situations.

I think you, as a committee, have got an opportunity, when you hear Katherine and Rudi Graf here in a minute—they are doing what brought me into this thing in 1956. I first went to see Senator Dirksen in 1956, having come back from a world trip, and I had seen so much bad grain had been unloaded. We were in a little elevator over here, where we docked the farmer if he didn't clean his grain, and if we didn't clean it before we put it in the railroad car, the guy docked us at the other end when it got there. So we learned that we had to have clean grain. But what I saw overseas was a total disaster. And in talking to Senator Dirksen—because I did travel behind the Red Curtain, I did have to go to the State Department—I stopped in to see the Senator and said, "Why don't we get a bill going, that we clean the grain at every place and we make it into alcohol so that we can't ever put it back into feed and grain." He said, "Young man, I made that speech 25 years ago." Well, Bill Holmberg and others dug it up this year in the Congressional Record and it was 21 years before. In 1931 he told us that ought to happen.

Here we are in 1984, Dick, still trying to put it together, and we're going to put it together with full support out of Washington. We're doing it here in the country and we're succeeding. But it's been tough. But unless we get a USDA policy that understands $9 billion worth of PIK could have been $9 billion worth of alcohol plants and this kind of thing, then we begin to understand what's going on. It's a real state of disaster we're in.

Jack Block knows better. Jack Block understood alcohol very well when he was here in Illinois, and I haven't heard him mention the word to the gentlemen talking about the new technologies. What the little plants have come up with will also make the big plants extremely more successful. One of the things we have had in the little plants, we have not been able to get the alcohol dry economically. We now have molecular sieves—and Jack and ADM have just installed one—and I see in your quarterly report it will save 35 percent, or reduce the energy some 35 percent. One new advance is that of taking the ethanol vapors as they come out of the plant, dehydrating them with their own vapors, and get a totally clean ethanol. We didn't have that 2 years ago. We've got it now, a 35 percent or more gain.

We now have filters that will take all the solids out of the water so the water will go back in the plants as back-set. Your Northern Laboratory needs to do some desperate research items up there.

They know that if you put the water back in you get 10 percent more beer. They didn't really understand why. Now we've begun to understand why. We are finding that the water coming down the distillation columns after it has been totally fermented is producing sugars. In the heat of distillation, there are new sugars breaking out that weren't there before. But when you put that water back in the plant, the yields are now going up 8 to 10 percent with reuse of the water, only now that the water is clean enough.

I asked my friends at Northern Labs why didn't we have this earlier. "Because we don't have personnel, we don't have the money to buy the equipment." You're putting a lot of money in a lot of places that is not being directed, I guess, Dick, in the right thing. If you people can direct it, it is one thing. Maybe you can't. But try.

We've got 80,000 bugs laying up at the Peoria Laboratory and I'll bet they haven't given a one to these gentlemen who are making them work. I'm worried about that.

Well, I'll get over here into a couple of other things I want to talk about. I want to talk about probably one of the greatest things I think coming down the industry is reverse osmosis. Now, you understand that when you understand dialysis for kidneys or you understand your blood. We've been running some water through a reverse osmosis machine, and an interesting thing comes out. When we do that, for the first time in the history of the industry, we now have got all the soluable nutrients that it took to grow the corn or the milo or whatever in exactly the proportion it took to grow the crop. An early test shows that foliar feeding it may be an absolute phenomenon, but certainly it's a phenomenon as a base for fertilizer without having to worry about kalating the trace elements in the thing. So the industry is moving, but it's moving on its own. I would like to see that any money you put out for research, that you put a committee together and you pinpoint the research and you put a deadline on it and you don't open-end anything.

The University of Illinois is doing some things on methane digesters. Don Day and his staff are doing it all on their own. They are not publicly funded at all but need help. They are finding that they can probably get as much energy out of the filtrate water that it takes to heat the plant under the new systems for methane digesters. But they need help and they need money. What I'm saying, don't put the money out unless it's pinpointed and given some deadline.

I see the people from the Energy Department here who have spent millions—and I can't think of the first gallon of alcohol they have produced.

Anyhow, that's all I have to say, Dick. Thank you.

[The prepared statement of Alvin Mavis follows:]

Prepared Statement of Al Mavis, Alenco, Rochester, IL

My name is Al Mavis. I am from Rochester, Illinois. Long before the oil crisis of the 70's, I sought to get ag ethanol going as a method of keeping; grain shipments clean, a way to keep off-grade grains and grain dust from being mixed with and adulterating our good grains and thereby reducing their quality for our customers. It was in 1956 that I proposed this idea to Senator Dirksen, who at that time told me that he made a speech to the U.S. Congress on the importance of using ag production for fuel. I thought he told me 25 years earlier. Congressional records show it was in 1935, 21 years earlier. He knew that America must develop a program to fuel its engines from ag ethanol as a way to keep agriculture financially sound. Isn't it something, it took 45 years and an oil crisis to get ag ethanol started and a plant in his home town of Pekin.

In 1977 Sec. of Agriculture John Block recognized that ag ethanol could play a role in conserving non-renewable petroleum, and he implemented an Energy Conservation Section. I was the first head of that Section. This lead to the slogan "Conservation by Substitution Not Denial", and just 5 weeks later Sec. Block and the Illinois Administration put a test fleet on gasohol made with ethanol from cheese whey of Wisconsin. This was followed by Archer Daniels Midland announcing their decision to produce and market "Power Alcohol"; Senator Percy introduced the bill to abate Federal tax on ethanol blended fuels so the customer could buy a better fuel at same price as regular. Then Sec. of Energy Duncan came to Illinois to see for himself the developing ag ethanol program.

On this day, November 2, 1978, Governor Thompson told Sec. Duncan that within the year the State of Illinois would use ethanol blends in all the State fleet. After seeing the ADM plant and having lunch with all the wet corn millers, Sec. Duncan said America could produce 500,000,000 gallons by 1982. Many laughed, others said absurd. This would have happend had not the present administration killed all projects and pulled out its support for renewable energy.

On behalf of the American taxpayer, and particularly the American farmer, I want to thank the Congressional Members of these Committees, and particularly Dick Durbin for their interest and dedication to fuel ethanol, a high technology in agriculture that processes low grade ag starch from grain and food processing plants into high quality, renewable fuel for America.

By coming here to Decatur, you can see for yourselves how the fuel ethanol industry has increased the domestic demand from farm production, how it has helped the economy through its building programs and its labor force. How it has led to local production of food (lettuce), which in turn has reduced transportation cost, saved our roads and non-renewable diesel fuel.

As you see for yourselves what has occured since 1977 because of the guts and leadership of Archer Daniels Midland, A.E. Staley, Texaco, the Stamme Family, Wendell Harris and the State of Illinois, you probably are thinking how far we have come, and how big and important this industry is here in Illinois.

You are correct in thinking this, but just think, if the industry came this far dragging the USDA, DOE, Congress and the Administration, how many more people would be employed, how much cleaner our environment, how much less risk we would need to take in the Middle East to protect the shipments of non-renwable oil, how many more bushels of grain would have had a domestic market had ag ethanol had full support it deserved.

Since this is a Joint Hearing, I will break my comments into a segment on agriculture and one on science and technology.

Agriculture: I would like to open the ag discussion with comments about the lack of good and continuous information being dissimulated by USDA information services, our extension people and our universities. All of these are being heavily funded by taxpayer dollars, but it is difficult to find any of them telling the story of the importance of ag ethanol to America, its taxpayer, its economy,its National security and certainly its farmers. Quite the opposite. They spend our monies telling us we need to export more raw grains to help pay the losses in our balance of trade, failing to realize that raw grain exports also carry with them our jobs, taxes and National security.

As late as December 1983, in reponse to the objections set forth in the Energy Security Act of 1980, the USDA was partner with DOE in a report "A Bio Mass Energy Production and Use Plan for 1983-90", in which the USDA allowed the statement to appear that said "ag ethanol is not likely to be economically feasible", then gave the reasons that

grain prices would go up, farmers would increase corn planting 15%, and soybeans and cotton acreages would decline. Net farm income could be expected to soar 40%, total grain exports could decline 8%, food prices would go up 4%, and that it would lead to significant inefficiencies in the use of recources and require massive subsidies.

This report is an insult to Congress, to the American taxpayer, and particularly the new ag ethanol industry, since the USDA report came on the heels of a multi-billion dollar PIK program designed to raise grain prices, increase net farm income and reduce grain stocks. It appears the USDA talks out of both sides of its mouth.

The USDA's 4 million bushel test program and its financing program for plants both were a disaster. The plants, that received approval for processing off-grade USDA grain, bought a "pig in a poke" since they were required to guarantee quantities of ethanol and cost of production without any knowledge of the quality of the grain USDA would furnish for processing. This requirement produced a program that was poorly planned and supervised, and as a result destroyed the program and most of the plant operators who were involved.

Farmers Home Administration financing for ethanol plants has not produced one success story that I am aware of. Quite the opposite, but most have not had their loans closed, and now the plants are closed because the field staff of FmHa did not know and understand, and the problems of processing grain into ag ethanol and protein. An engineer's stamp on the blueprint is no guarantee of success of an ag ethanol plant.

As early as 1980 and as late as December 1983, a group of us have attempted to get the USDA to assemble a trouble shooting team that would go into these problem plants and turn the situation around, so that the plant would succeed, save FmHa money and reputation, and prevent local investers and farmers from losing their equity and their farms. Tunnel vision and convinced bureaucratic staff engineers had approved the plans, therefore the plant should work. Not true!

What I am suggesting now would not have worked without the ag ethanol industry. When the day comes this Committee realizes that mixing off-grade and out-of-condition grain with good is "adulteration", not blending, and prohibits such, our export market will stiffen because we ship quality not quantity, and America will not be a supplier of last resport.

It is my guess that CCC is the largest owner and seller of off-grade grain in America, and perhaps the world. During this past year I have known of large volumes of off-grade grain being sold back to the grain trade, where it was mixed with good grain so as to assure our customers get the maximum amount of damaged and moldy grain, dirt, smell and trash that is permissible.

Any small scale plant can take 56 pounds of off-grade and damaged corn and produce about as much ag ethanol as does 56 pounds of #2 corn. Samples processed at USDA Northern Lab show the protein to be as high or higher and to date no tests have shown any toxicity present.

By small scale I mean community sized plants that can vary their feedstock with each batch run without upsetting their process.

If this Hearing would make such a recommendation to the full Committee, and push for its implementation, this would in itself, give the community sized ethanol plant a shot in the arm, and improve the quality of grain offered to our customers.

Science and Technology: To the Committee Members on Science and Technology, the success of the ethanol industry will give America renewable ethanol one of the basic building blocks for our continued use of chemicals for industry and transportation.

One of the most important things for your Committee to do is to get out to the people of America the extreme difference in ethanol and methanol. That ethanol is renewable, methanol is not. That the big and powerful methanol group is attempting to ride into the fuel market on the skirt of ethanol, but that methanol is corrosive, is deadly if breathed or consumed, and when it gets into ground water through a spill, cannot be cleaned up. None of this is true about ethanol. If they think it is the same, then let them make their martinis out of methanol. I will make mine out of ethanol.

In these last 3 years there have been three major developments that are revolutionizing our new industry. They are:

(1) Vapor phase-molecular sieve dehydration of fermented alcohol.

(2) Coated-rotary vaccum filters that recover all particulate down to ½ micron size, sharply increasing the pounds of protein and oils that are recovered per bushel, and producing a filtrate clear enough for reuse in plants. USDA Norther Lab confirms that reuse of stillage water of such

clarity increases yields and sharply reduces water requirements of the plant. The staff reports if cannot fully develop all parameters, since they have no funds to purchase equipment or staff.

(3) Reverse osmosis systems that further clarify the filtrate for maximum plant reuse. This system concentrates the solubles without expense of evaporation, and for the first time has in a concentrated solution all the soluble nutrients it took to grow the feedstock (corn, grain sorghum, etc.) in the proportion it takes to grow the crop. Unusual opportunity as fertilizer base, foliar feeding or livestock feed base. Here we need USDA funds earmarked for this, but with deadlines.

New technologies that need funding and controlled research are ag ethanol as aviation fuel. Illinois Department of Transportation has basics in place and a plan ready to move forward, but lack funding. They need help now!

Ag ethanol to power plant generators, for irrigation engines and for farming. When used to fuel generators for ag ethanol plants it will produce the electricity for the plant, recover the heat for process water and give the plant the energy it needs so as to qualify for the Energy Investment Tax Credit.

Ford Tractor Company is ready to move forward in this area, and would like to bring their small tractor in from Brazil. This would help get America ethanol engine oriented, but why not do it in America?

Methane digesters, that are small in size, fast in reaction, that will remove the volatile solids from the plant filtrate as a form of energy for plant use are now a real possibility. Don Day of Ag Engineering Department, University of Illinois, Urbana and others have been working in this area without funding and personnel. Early work indicates this to be feasible and profitable, but needs to be scaled up.

Immediate directed funding for these projects is needed and would be minimal in cost, but maximum in returns.

I am confident this oversight Committee could find all the monies needed for these projects by putting a stop to duplicate research projects and projects that are re-inventing the wheel. A Committee from the ag ethanol industry would not have much trouble in finding these wasteful areas.

Dispersal of research funds has long needed an overhaul, if we are to get the projects on or off the list. Rather than funding them with open ends, a system that puts up substantial funds for the first person, group or agency to reach a specific goal is needed. If this is accomplished by a group, such as a University, make certain that the individuals involved get their share and that the University does not get it all.

The ag ethanol industry will succeed on its own, but many of the problems facing America, its taxpayers and particularly its farmers will be sharply reduced if this industry is given immediate and full support.

Ag ethanol is high technology in agriculture.

Ag ethanol is a domestic market for ag production.

Ag ethanol is a job builder for America.

Ag ethanol is a tax producer, not a loss.

Ag ethanol will reduce soybean acerage.

Ag ethanol will reduce erosion.

Ag ethanol can replace poisonous lead as an octane enhancer.

Ag ethanol plants are environmentally clean.

Ag ethanol converts starchy grains to protein and oil concentrates.

Illinois Agri-News-Friday, Dec. 9, 1983-

All-out fuel grain alcohol output program not 'feasible'

WASHINGTON (AP) — A new government report raises the question of what would happen if the United States went all-out to produce fuel-grade alcohol from corn so that production reached at least 8.4 billion gallons by 1990.

If the goal — which was prescribed by Congress in a 1980 law — is met, there will be some fundamental changes in U.S. agriculture and how farmers and consumers do business.

But the report said the fuel alcohol objective, while technologically attainable, is "not likely to be economically feasible." Moreover, it said, the Reagan administration believes the goal is unrealistic since it could lead to inefficiency and massive federal subsidies.

The use of so much corn for the production of alcohol — ethanol — for use in fuel, would boost prices of the grain by 41 percent, compared to what prices would be if no significant alcohol is produced, analysts said.

Corn prices at the farm could be expected to average $5.41 per bushel in 1990 with all-out ethanol production, compared to a projected average of $4.35 without such an effort.

Farmers would boost corn acreages by 15 percent to take care of the added demand, with smaller increases for sorghum and barley. Soybean and cotton acreages would decline, while wheat and oats would hold about steady.

Prices and production patterns of other crops and livestock also would be affected as farmers adjusted to the huge fuel demand. Total grain exports could decline 8 percent from the trend now projected.

Net farm income, however, could be expected to soar about 40 percent from what it otherwise would be in 1990, the report said.

Consumer food prices were projected to be 4 percent higher, overall, under the theoretical projection or scenario. That would include an 11 percent gain for beef, veal and poultry; and 12 percent for pork.

The report — entitled "A Biomass Energy Production and Use Plan for the United States, 1983-90" — was prepared by the departments of Agriculture and Energy in response to the objectives set forth in the Energy Security Act of 1980.

In this case, biomass refers to plant and animal sources of energy. Those can include garbage, wood products and animal wastes, in addition to grain and crop residues.

"The plan addresses the act's mandate to achieve alcohol fuel production and use by 1990 equal to at least 10 percent of the level of gasoline consumption, or 8.4 billion gallons using 1981 projections," the report said.

But the report included only two specific recommendations — that "market forces" should be allowed to determine the types and quantities of biomass energy that will be produced and consumed, and that support should be given to seeking longer-term biomass energy research and development.

"The administration believes it would be both inappropriate and undesirable to adopt the act's goal as a policy objective because it would lead to significant inefficiencies in the use of resources and require massive government subsidies," the report said.

Mr. DURBIN. Al, we really appreciate your remarks. I'm happy that this hearing could bring you out from the "underground" of ethanol and—[laughter]—and we can start meeting in regular office buildings from this day forward.

Mr. SKEEN. Your life won't be nearly as rich, though, as it has been.

Mr. MAVIS. You know, when Marlyn and I were under that tree, we always didn't talk alcohol.

[Laughter.]

If I've embarrassed you, Marlyn, I'm sorry. A real friend of alcohol.

Mr. DURBIN. Our next witness is from Watertown, MN, and she and her family are operating the Graf Feed & Fuel Alcohol Plant there. I would like to introduce at this time Mrs. Kathy Graf, who is accompanied by her husband, Rudiger Graf.

Mrs. Graf.

Mrs. GRAF. Yes. My husband, Rudi, will start with the statement.

Mr. GRAF. Thank you, Mr. Chairman. I will probably start out, and then my wife can follow up and tell what I forgot to tell.

Mr. DURBIN. If you will use the microphone there, we will be sure to get it all on tape.

Mr. GRAF. OK. We are farming in Minnesota and I always was interested in the alcohol. I'm a German native and in Germany we make alcohol for a long time already, but for beverages and not for fuel alcohol. But the procedure is the same.

We started our alcohol production in 1983, about 14 months ago. We use German technology and we are producing about 400,000 gallons a year. That means about 65 gallons an hour. But when we started out, we always had in mind, because we couldn't make alcohol out of good corn because we didn't see the feasibility there, so we always use distressed corn which is always available at all times and there is a lot available. Right now we could buy 100,000 bushels of distressed corn, which is mostly CCC corn, which we get presently for $1.50. So we thought we should follow up on that and used distressed corn and it worked out very well. We almost get the same yields on distressed corn than on good corn, about 2.5 gallons a bushel.

What we also find out, because in order to come out we have to sell our feed, our distillers grain, but since we had a hard winter, we cannot sell our distillers grain wet. We have to dry it with a centrifuge that has a byproduct later on of 65 percent, which we bag in plastic bags, and that way we seal it so that the farmer who is buying it locally can store it at his barn for at least a week or two without spoilage. We get about 5 cents a pound for that distillers grain.

So that assures that with good technology, with probably a byproduct out of the grain from the grain farms, which is distressed corn, there is a good marketing of the distillers grain as feed. We made it possible to be successful even on a small scale.

Mr. Reed mentioned already other advantages of making alcohol and what problems we are facing to get a better price because of Brazilian alcohol. Because when we started out the Brazilian alcohol entered the market, so when we did our feasibility studies, we figured $1.65 alcohol, and then the Brazilian alcohol came in and it

dropped to $1.50 and below $1.50 in our State. So we really need some support of the Federal Government, and also the local government, which is not doing everything possible because we just get 2 cents right now per gallon of alcohol at the pump—I mean gasohol at the pump. So it would be nice if other people could educate our local government on the advantage of alcohol in the gasoline. It would be advantageous also to the small producers because we had about four or five plants in our area in Minnesota which all went broke because of bad prices—and also bad technology and poor management—but the prices were really the main factor.

There is so much good technology available, but most people don't know where to turn to. So we need also the education to the producer, to the small producer, where he can turn to to find out what really the best technology is, and not people coming up and saying I can sell you a plant, which never works, which happened in the neighborhood, which was an investor-type plant, and somebody who went broke before told them "Oh, I can build you a distillation column and I can build you everything" and then it didn't work after all the money was spent. Most money was even spent indirectly through the Government because the people who invested it had their tax credit. So all that money went down the drain.

It would be nice if the Government could give not all the money to the distributor, which pockets the money. It would be nice if the producer also could get some money in his hands for producing the alcohol, because the tax incentives at the pump doesn't get all the way back to the producer or to the grain farmer.

So that's all I have to say, unless my wife wants to say some more.

Mrs. GRAF. Sitting here at a board with such large companies as yours, I guess that I do have a desire to also speak out in favor of the small plant like ours, to point out that it does have a place in the total structure, in that we are able to buy our distressed corn right within our area, so that we are providing a serivce for our nearby farmers who have, unfortunately, gotten the distressed grain nearby.

Also, if a person were able to operate a plant with No. 2 yellow corn, you would be able to buy it right within the local area. You wouldn't have the great hauling distance and everything involved, which, of course, gets difficult for the roads and everything else. But also, then we are able to sell this distillers grain. As my husband said, we have about 40 farmers using our feed product and we are able to sell it again and service the community right around us. So that an alcohol plant, of course, to get the tremendous volume that is necessary to make macroeconomics work, on a small basis, the microeconomics works right within the community, that the small plants do have a function in the small community, and that they can work as long as they get the correct technology.

I guess one thing that is quite disturbing that we hear an awful lot of within the alcohol world is that back when the big boom came there were an awful lot of charlatans out there selling products that they really didn't know anything more about than on paper. I guess at this point, as we see it, it is time to figure out some system of starting to separate the chaff from the wheat, and when Government funds are being allocated, that they can please

get a hold of somebody who knows something really and doesn't just talk well and smile good and pat you on the shoulder when the money hasn't worked out and they walk on down their road. That really hurts our industry. It hurts the attitude people have about the alcohol industry.

We have one bank that is supporting us on part of our financing, and if we can stay in there for another year or two, slowly, another bank is going to say "Oh, not all alcohol plants have to go under. Well, maybe we can risk it." The credibility, the believability of the industry, really needs to be improved.

I guess also we have an instance at the State level right now where boy, they were trying to hand over funds that came from somewhere to reestablish a small plant that had gone under, but there was no hope. If they had gotten that money from the Government, they still would not have made it because the Government was not getting the right advice and the right kind of background for what they were putting their money into. This is one of the big problems. Because we don't want to be one of the small, the only—we're just about the only alcohol plant right now in Minnesota. We're the only alcohol plant. We don't want that position. We want other small alcohol plants to be there. We don't want to carry it all by ourselves. We need the support of them. But from the government level it also has to be carefully observed, that a person is careful about it.

Also, training programs. I'm looking at my notes here now. Training programs would be another area that would be very helpful, that people could get positive working advice before they go into producing alcohol on a small basis, because generally it's going to be people like ourselves who had no background. We're not chemists, we're not—we're farmers that went into alcohol. A good training system. And that's not going to be done on a private basis. That's going to be a publicly funded situation. Again, get the right advice, not from people who just talk good, but who really have the background.

These are some of the major hurdles that we have gone over, except that we have stayed alive. When we set up our plant, corn was at $2 for No. 2 yellow, and as we said, alcohol was at $1.65. We got to a point of no return and alcohol dropped to $1.50 and lower and corn went up to over $3. So that we're still alive and kicking is quite surprising to us, too.

Again, we want to thank you for the opportunity to be here. And any time we can be used as a reference base or a tool of some fashion, we would be more than happy to do our part.

[The prepared statement of Mrs. Graf follows:]

Graf Feed and Fuel Alcohol
4375 County Road 10 North
Watertown, Minnesota 55388
Telephone 612 955-1666

Our family has, as of April 1983, expanded our farming operation to include a fuel alcohol plant. We produce about 60 gallons per hour of very clean 199+ proof alcohol. Our molecular sieve anhydrous system is double capacity, thus enabling us to do custom upgrading of wet alcohol from other plants.

Currently, we are producing about 1200 gallons per day. We use approximately 480 bushel of distressed or damaged corn which we acquire with in the state. The mill, cooking system, distillation system, dehydration and centrifuge are from Germany and are of the most modern technology even by German standards.

The distiller's grain that we produce we sell to our near-by dairy farmers at 65% moisture and it has tested out consistantly at over 30% protein. There are approximately forty farmers currently using the product and the response has been very good.

Our plant is privately owned and is operated as a family business. We have 1 employee , beside our six children who range in age from 5 to 15 years old. There is one adult and one child per shift.

At the bottom of this page is a sample of the figures that we work with to give you an idea of the micro economics of the fuel alcohol industry.

Anyone who is interested in visiting the plant are very welcome. You can contact us at the above telephone number. Also feel free to ask any more questions and we will do our best to answer.

All of us thank you for your time and interest.

Given factors in this example:

Corn price - $3.00 per bushel Conversion - 2.6 gallons per bushel
The distillers grain in this example is dry and sold bulk at$180.00 per ton. (We would have to run full capacity to justify paying $3.00 for corn, but then would have a more difficult time moving all of the grain wet).

PER GALLON EXPENSE	
$1.15	gross corn price
.70	corn cost recovered through distiller's grain
.45	corn cost for alcohol
.10	labor
.10	insurance
.35	energy (oil and electricity)
.15	enzymes and yeast
.30	interest, taxes, depreciation
.05	maintenence and improvements
$1.50	

Mr. DURBIN. Thank you. We welcome our Minnesota neighbors to Illinois.

I have two questions, and I will address them to each pair on the panel. The first question would be addressed to Mr. Reed and Mr. Schwandt.

I think when we look at ethanol, what it can do for our Nation, the positive things it offers when it is set against lead and gasoline, for example, what it can do for our economy, the independents and such, it looks like there are very positive things for national goals that we ought to be setting and trying to achieve.

The basic question which we are going to wrestle with on a practical basis is whether or not the subsidy that we're talking about, the Federal tax subsidy, does have any bearing on the future of the ethanol industry. With it or without it, are we going to see the ethanol industry expand in this country? From the perspective of Staley and ADM, how important is this subsidy over the next 4 or 5 years to the future of the ethanol industry in the United States? Jack, do you want to start, or Bob?

Mr. SCHWANDT. Go ahead, Jack.

Mr. REED. We think it is very important. One of the problems that the industry has had to date arises out of the great variety of State incentives which exist, variety in terms of the size of the sales tax exemption and variety in terms of the regulations which the States attach to the provision of sales tax exemptions.

This is a very serious handicap, particularly for a major refiner, say, in developing a national marketing program, because their programs don't like to stop at State lines or have to be reformed at every State border that the alcohol crosses. So, to the extent that the Federal subsidy replaces the great variety of State sales tax exemptions, it is important.

It is also important economically because without it we seriously doubt there would be enough incentive to get the industry up and running. So, for the next 5 years, at least, it's an extremely important factor.

Mr. DURBIN. Bob?

Mr. SCHWANDT. I would say for the period which the legislation stands, through 1992, and surely for the shorter term, it's an absolute necessity. In the time since this business or this industry was organized, we have seen a deterioration in the price of gasoline of about 30 cents a gallon, and currently looking at the December futures of the new crop and discarding what happened this past year, we still see a 20 or 30 cent difference in the per gallon cost of corn over where it was when we started. The improvement from 4 cents to 6 cents is only half of that. It's an absolute necessity that we retain these things through the current period.

Thank you.

Mr. DURBIN. Thank you. And I would like to ask a question then of the Grafs and Al Mavis. Not too many years ago, when we first started talking about gasohol and ethanol, it reminded me a little bit of when Chairman Mao in Red China had his great leap forward and had all of the peasants building steel mills in their back yards. It didn't work out too well and they abandoned that. They said that just isn't efficient. It took them a number of years to come to that realization.

When I first started hearing talk about gasohol and ethanol, there was a suggestion that almost every farmer could put a "still" in the back behind the barn and produce some alcohol and burn it in their machinery and equipment. It appears we have kind of abandoned that approach and really decided to look for a different level of economy, a different level of production, and one that would be, in effect, efficient, economical.

From what I hear, Al, in your experience and with the Grafs' experience, there is some level at which we can have this efficient production of ethanol. Is it the type of thing that we can say now with any kind of certainty, that at a certain level of production we do have an economy of scale and below it it is not practical for an individual to start ethanol production on their own or in a cooperative way?

Mrs. GRAF. No, I—Again, I would say that really it's a case of, if the correct technology is being used there, that it can be very practical at almost any level. There is definitely a place, too, for the small plant; that is, for the individual farmer, as long as he can really carry the burden financially to get it rolling, that he doesn't go too far in debt.

But as I said, too, within the community you do operate and there is the give and take and the building of the pattern within the community, and yes, I definitely think it has a big advantage, place for it. We can't on a small scale produce the large volume that you need for the change in the world economy or the national economy, but on a local basis, very definitely. And as long as the technology and the management is there, it can be done.

Mr. MAVIS. What Kathy said is very correct. It is site-specific, Dick. For instance, a plant that takes candy wastes out of Chicago will be a 2 million gallon plant and it will take all of Jay's potatoes and Brach's candy—that's fine. They're using damaged grain. Those community sized plants that will pick up this damaged grain, I didn't get anything because it was so controversial. I have always figured mixing bad grain with good was adulteration. I have not been able to sell those words, but I still think the committee can do that.

But anyhow, when that takes place, if we really get the place to recognize that we left that corn in the country, now that we have small alcohol plants that can convert it into something that is valuable, we'll have a much better grain market and we'll have a lot of other things.

I think the plant they're going to build at Montecello has a lot of merit. It's right in the shadow of the smoke screen of ADM, but that doesn't make any difference. The corn is still out there, the livestock is over there, the demand is there. Everything is site-specific.

Clovis, NM, where you come from, Congressman Skeen, you people have piled this thing into that town only because there's a fuel demand in the area, not that the thing is exciting. But the cattle are there to eat the mash, you've got a lot of things going for you. So I think it's site-specific. Of course, you have some problem out there. You didn't clean up your water the last I was out there and you had some problems——

Mr. SKEEN. What water? [Laughter.]

Mr. MAVIS. Anyhow, Dick, I think there's a place for a little bit of everything. In Congressman Simon's area there's a plant that's showing it. They have a tractor running on their own wet fuel, and yet they're dehydrating to sell to the local fuel people. So it's all site-specific. And we need them all because that's where the local urban areas will stay alive.

Mr. DURBIN. Thank you, Al.

At this point I would like to recognize my colleague from the House Science and Technology Committee, Paul Simon, who has joined us. Paul, we thank you for coming by today.

Mr. SIMON. I thank you, and my apologies to the witnesses for not being here earlier. I want to commend my colleague, Dick Durbin, for having this. And my colleague from New Mexico, Joe Skeen, we are happy to have you here in Illinois.

Mr. SKEEN. Thank you, Paul. I came over here to check up on the Senate race.

Mr. SIMON. I've heard there is one here. [Laughter.]

I will enter a full statement in the record.

Let me just make a couple of comments, briefly, and that is the need to note the progress that has been made, and yet to note that a great deal more clearly needs to be done. Last year service stations throughout America pumped some 4 billion gallons of gasohol, using about 400 million gallons of alcohol fuel, but it's a long way from our potential. We have not reached that potential in part because, frankly, under both administrations—really three administrations now I have served with—we really do not have an energy policy yet in our country. We're kind of groping for it. We do not have a plan yet today, believe it or not. If Saudi Arabia tomorrow were to stop all the oil flow, we do not have a plan in place on what we should do. We ought to be encouraging the development of alternative energy resources, and clearly, this is one. No one suggests that alcohol fuels are going to solve all of our problems, but they can be a good part of the answer.

And then, just a couple of other comments. I don't know who has the yellow and green plane. I landed at the airport out here. It's an ethanol—Is that Staley's? It's the State of Illinois, 100 percent ethanol. It's the most brightly painted State of Illinois plane, I'll tell you. But it was great to see it, an ethanol-powered plane out there. I commend whoever is responsible for putting it together.

Down in my district, Gene Stamme, a farmer, has an energy operation, a small energy operation, that really makes sense. That kind of thing we ought to be doing just a heck of a lot more to encourage.

As I read the reports from the Library of Congress, the Congressional Research Service, the whole question of alcohol fuels is marginal now in cost effectiveness. But that marginality is going to disappear, just as soon as the price of oil goes up, and just as certain as we're sitting here, the time is going to come when that price of oil goes up.

I also want to commend my colleague, Dick Durbin, for a bill that will increase—and I'm pleased to be a cosponsor—that increases the exemption for the ethanol operation, for the alcohol-based fuels, grain-related fuels, where step by step we increase the exemption for up to 3 years and then gradually pull it down to en-

courage the development of the technology. I think it's a direction we have to be going.

Anyway, my apologies for being here late.

Mr. MAVIS. Congressman, could I break in? I thought the two big people would bring it up. Probably one of the worst things that has happened to the industry is methanol riding on the shirttails of ethanol, and I really thought you people would bring it up because it's a real problem. There are towns I go into now with big signs on stations "Our gas contains no alcohol." It's destructive. Because what happens, the methanol people come in the back side and are riding in on the shirttails of a good product and it's forcing a lot of stations to put those kinds of signs up simply because people don't understand.

I think you have got to be very careful. There's a move on in this administration to put a methanol fleet of cars in service. Why not ethanol cars? I mean, what I'm saying to you again, your committees are going to be vitally important—it's in the report. But I'm surprised you people don't really get after that methanol thing. It's destroying—we may have to go back and use the word "gasohol" again so people understand that it is a 10 percent blend of ethanol, as a way to beat that thing. That's a thought.

Mr. DURBIN. Let me turn it over here to my colleague from New Mexico, who came a long way to join us today. Joe, thank you. I'd be glad to have any questions you have of the panel.

Mr. SKEEN. Dick, I'm delighted to be here. You and Paul are great company, as always, and I am delighted to be in this great State of Illinois and you're great examples of the kind of people that come from this area. It's good company to be in.

I also would like to take a little liberty here and introduce, if I might, Mario Castillo, who is Kika de la Garza's representative, the chairman of the Agriculture Committee.

Mr. DURBIN. Welcome, Mario.

Mr. SKEEN. He is "muy amigo estimable" from that part of the country down there called the Southwest. I knew you were interested in bilingualism and so forth, Paul. [Laughter.]

He is one of the best drivers on the Rock Creek Parkway you ever saw when the traffic changes to one way going the opposite direction. [Laughter.]

Mario, it's good to see you.

Al, you have made some of the most—this panel has been an excellent one and you have made some of the most cogent statements in regard to this problem. I want to ask a question, but I also want to clear up a few things, too.

The big problem with the ethanol-methanol question is that so few people really understand the difference, including those of us in Congress. No one really understands. And I come from a State that has a lot of coal. The possibility of translating that coal into methanol has always been a siren that has led us into this area. So I have one side of the State that is interested in methanol production and I've got the other side of the State, the agricultural side, in ethanol. There is no clear distinction in a lot of folks' minds. But methanol is a very hazardous and a very harmful additive. Yeah, it can be turned into fuel, but compared to ethanol—ethanol is a benign, sweet lady compared to methanol production because we're

trying to clean up the atmosphere. But no one has ever had a program that really educated people to understand the difference and that is a problem, as education always is—and Paul Simon can tell you that, on any issue like this.

The problem that we are having, to go along with some of the statements made by the Grafs and the others here, ethanol production has got a real bad name in the agricultural communities because of investor-generated opportunities that came along, and it was more of an investment type thing than it was are we really interested in producing alcohol, ethanol. And west Texas and eastern New Mexico and Kansas and many other States that have large grain producing areas are strewn with plants that failed because of the management, not because of the possibility of producing the alcohol.

We got into that same position in New Mexico because we've had industrial bonds issued by communities to help spark this industry because everybody wants jobs, everybody wants to help the agricultural community and so on, so it's a natural thing. They want to make money. We have had a lot of shysters in this business and they've sold a lot of plants that are out sitting idle now all through the farming country, and that's a disaster.

However, there are an awful lot of these plants that are producing. You said the program has been, in retrospect, and viewed from your stance, too, Al—I can see that you spent a lot of your life and time trying to move the United States toward the idea that we can become self-sufficient in energy production in this particular area, if we really understood the thing. I can see your frustration. But we have made some progress. We're 169 percent up from what we were just a few years ago now in the production, but that's not saying a whole lot because the production is still too low.

But I want to say that, once again, we find ourselves in the community, in Clovis, NM, with a lot of investor-run plants from outside the state, that had good management at the local level, but the top management as far as the companies were concerned were not managed well. We have a tax incentive that the State applied to the production of ethanol, but all the incentives in the world would not have helped that problem because they were capital poor and they starved the operation completely out. However, because of the great production and great record that they did have, because of local management, we stand to put them back in use.

I think that one area I would be interested in hearing some response from are these plants that were abandoned and so forth, there should be a consulting group—Mrs. Graf, I think you're exactly right—available to some of these communities that would like to start them up again, but to advise them whether they should or should not, you know, what's the optimum level, because we still have the equipment and the capitalization laying out there and there is still an interest. Now, with the——

By the way, in that tax bill, there is—and I wanted to ask you—how much are we importing now from Brazil?

Mr. REED. It's been running between 50 and 60 million gallons a year in the last couple of years.

Mr. SKEEN. There is a 40-cent-a-gallon tariff?

Mr. REED. Fifty.

Mr. SCHWANDT. It becomes 60 in January.

Mr. SKEEN. That's right. It's going from 50 to 60. Anyway, there is an increase in this bill from 50 to 60, I believe it is. That's a considerable tariff on this thing and that's an awful lot of imported fuel when we're trying to produce it here in this country. It was just curious. It has had a great impact, but at least we're recognizing some of it because they did increase the tariff on the thing. I don't know how much help that's going to be.

But I want to commend all of you for your interest in this thing. It is hard to compete with 70—if you've got to value your corn at 70 cents a bushel, to try to produce alcohol out of it. It just doesn't compute.

But I thought I would just bring up those things. I was not a question. But I do want to make that point, that a lot of the failures we had was because they were investor-oriented rather than production-oriented, and you folks have the right grip on this thing. You know where you're going. That's been the terrible tragedy. Another educational thing that we need to do is folks that get interested in ethanol production ought to be aware, and I think they are far more aware today of what's been going on in that area, and the charlatans are still there, but they're slowly being weeded out. But it has given the whole industry a bad name and that's regrettable.

Thank you.

Mr. DURBIN. Thank you, Joe.

Mr. SIMON. Could I ask one question of the Grafs?

Mr. DURBIN. Go right ahead.

Mr. SIMON. My apologies, and you may have gone over this. But as I look over the various testimony, as you look at your per gallon price, you come down to a dollar and a half. That's based on $3 corn. When corn is selling for $3.40, obviously that moves up a little bit.

Now, how can you continue to operate at a dollar and a half a gallon?

Mr. GRAF. Because we are using distressed corn. So in case we ever run out of distressed corn, we can use $3.50 corn and still have an average of $3 corn.

Mrs. GRAF. Also, if there is a permanent price increase in corn, your distillers grain price goes up, so that you have a balancing factor there.

Mr. SKEEN. Let me ask just one final question—I'm sorry. Another distressing thing about this is reading the Congressional Research Service's reports in which they have included an Office of Technology Assessment statement. Continually, I think one of the problems we have with the Department of Agriculture is that they get themselves into the economic midstream on this thing. They come up with the statement, this question of food versus fuel in the value of the corn, declaring that 1 to 2 billion gallons of ethanol per year could be produced from agricultural crops without significant impact, but higher production levels could lead to inflationary trends in food and feed markets.

I'm sick and tired, for one—and I ought to get some response from you folks in the production area—of constantly trying to tell the consumer that if agriculture gets more money for its product

over there, that the big problem is that you're going to pay more for the food that you buy, in a country that has the kinds and diversity of production that we have.

Could I get a comment from any of you about the validity of that kind of a statement?

Mr. GRAF. Yeah. I don't think it can be right because we are producing a cheap feed which is very excellent——

Mr. SKEEN. That's right.

Mr. GRAF. So we are servicing, do a service to the grain farmer, to give him a better price, and still have a cheaper byproduct which is as good as corn to the livestock farmers. So the livestock farmer really had to suffer in the PIK Program because he had to pay higher prices. So we are selling our byproduct to dairy farmers, and we know what is going on in the dairy industry because the dairy industry is suffering like never before. They have a hard time to make ends meet.

But our byproduct, we are still having a cheap feed available which is independent of the corn price. So that means——

Mr. SKEEN. So if we start making more alcohol out of feedstuffs, like corn or milo and some of the rest, you're not running into any danger of upping the consumer price of food appreciably in this country because the production is there and the kinds and grades and so forth are all there. So this statement that keeps recurring time and again to warn that we might raise the cost of food to human beings is just not a valid argument.

Mr. SCHWANDT. Mr. Congressman, I suggest that the 1981-82 crops of corn alone were well over 8 billion bushels. And even with a determined effort to export in a reducing export environment, we were still able to utilize well under 7 billion bushels.

If you turn our farmers loose and have a decent year, we're going to produce 1½ billion bushels of corn in excess of our fondest hopes for sale and market. We can either turn to the Federal Treasury to figure out something to do with that 1½ billion bushels of corn, or you can turn it into 4 billion gallons of ethanol without in any way disturbing the 7 billion basic bushels for which there is a market.

Mr. DURBIN. Thank you very much.

I want to thank this panel for an excellent presentation. We hear a lot of panels in our congressional committee hearings and you have done a fine job this morning. We thank you for joining us.

Mr. DURBIN. At this point I would like to introduce the next panel. From West Lafayette, Indiana and Purdue University we have Professor Wallace Tyner with the Department of Agricultural Economics at Purdue; from our own Urbana-Champaign area we have Mr. Robert J. Hauser and Mr. John Braden, both of the Department of Agricultural Economics. I might add that my training was in economics and I always recall the statement made by Harry Truman, who said that he was spending all his time in Washington looking for a one-armed economist who wouldn't be able to say "and now, on the other hand." So we bring in our economic experts here to give us their perspective on the future of ethanol, and we thank them for joining us this morning.

Prior to the testimony I would like to mention that my colleague, Mr. Skeen, being from New Mexico, is at the mercy of our commut-

er airlines here and may have to duck out a few minutes early. I just appreciate the heroic efforts you made to get from New Mexico to Decatur, IL and join us this morning.

Mr. SKEEN. Thank you, Dick, and I apologize for having to leave.

Mr. DURBIN. No problem whatsoever.

Mr. SKEEN. Just one of the factors of life that we live with.

Mr. DURBIN. Let me first introduce Prof. Wallace Tyner from Purdue University.

STATEMENTS OF WALLACE E. TYNER, PROFESSOR AND ASSISTANT HEAD FOR RESEARCH, DEPARTMENT OF AGRICULTURAL ECONOMICS, PURDUE UNIVERSITY; ROBERT J. HAUSER AND JOHN B. BRADEN, ASSISTANT PROFESSORS OF AGRICULTURAL ECONOMICS, UNIVERSITY OF ILLINOIS

Professor TYNER. I appreciate the opportunity to be here and to discuss my views on H.R. 5727, and I would like to do that and comment generally on alcohol fuel policy issues.

At the very beginning I want to state that the conclusion that I reach on H.R. 5727 from an economic perspective is that the additional alcohol fuel subsidy provided by the bill isn't needed at this time. There may be, though, political grounds or strategic grounds that would lead one to support that, and I will discuss those at the end of the testimony. What I am going to try to do is to provide answers to the questions you posed and provide other information as it is appropriate.

Your first question concerns the near- and long-term viability of the U.S. ethanol industry and the impacts that industry might have on agriculture. I want to consider the viability issue both with and without subsidies. Without subsidies, I don't believe that the grain ethanol industry is viable in the long run. Ethanol costs, depending on whose numbers you use, between $1.60 and $1.70 to produce with $3.50 corn; $1.50 to $1.60 with $3 corn—and we expect corn to be $3 or below by fall. The New York gasoline price as of July 3 was 77 cents a gallon. The gasoline price would have to double and corn prices remain constant for alcohol to be competitive as a fuel. Today, both the Federal and the State subsidies are needed to make ethanol competitive.

Another important factor is that we have large reserves in the United States of competing fuels if the price of oil does rise significantly. In 1981, we completed a study for the Department of Transportation comparing, among other things, liquid fuels from biomass, from shale oil, and from coal. Our conclusions at that time—and they haven't changed much in relative terms—were that shale oil and coal liquids would both be cheaper to produce than alcohol fuels from grain. Shale liquids were estimated to cost in the range of $40 to $45 a barrel, coal liquids $50 to $55 a barrel, and grain alcohol in the sixties. We do have huge reserves of both shale and coal, and if market conditions ever did permit—and they may well at some point—large quantities of liquid fuel production from those sources would be possible.

It is also interesting to note that the current subsidy on alcohol fuel, the 60 cents per gallon subsidy, or $25 per barrel, would be

adequate to induce production of shale oil liquids, even though by itself it is not adequate for ethanol.

When we turn to a subsidized ethanol industry, of course, the viability depends upon the level of the subsidy and the level of other prices and costs in the economy. If State and Federal subsidies continue at roughly their current levels, my judgment is that the ethanol industry will continue to grow and survive. Combined Federal and State subsidies currently average over a dollar a gallon—60 cents Federal, with the new bill, and 45 cents average for those States with subsidies. The research evidence we have to date suggests that this level is sufficient to permit a reasonable profit for efficient ethanol producers.

The next part of your question concerns the impacts of the ethanol industry on U.S. agriculture. The earlier research that has been done, both in universities and at USDA, indicates that in the 2- to 3-billion gallon range that you talked about earlier, we can—that the United States can have that level of production before significant grain price increases are felt. We have excess capacity in agriculture and we can expand production up to that limit and experience very little change in price. In fact, we now pay farmers not to produce—through PIK and setasides and diversion payments, et cetera—so the net cost of subsidizing grain alcohol is considerably lower than the gross subsidy cost. In other words, every bushel of corn that is purchased on the market for alcohol conversion causes a reduction in the payments required to take land out of production, and the alcohol demand for corn also narrows the gap between Government support prices and the market price, thereby lowering the price based subsidy costs.

At alcohol production levels up to 2 to 3 billion gallons, the impacts on agriculture would be minimal, but agricultural program costs would be reduced. In fact, producing the grain for alcohol could be viewed, and perhaps should be viewed, at least as a partial alternative to the current set of policies that support prices directly and constrain production.

In 1979, we estimated that alcohol subsidy costs would roughly balance reduced agricultural commodity program costs. Since that time, both the alcohol subsidy and commodity subsidy costs have increased substantially. We haven't reestimated the balance between subsidy costs and reduction in agricultural program costs under 1984 conditions, but it generally costs about 60 percent of the market price to take land out of production. It appears that the cost to subsidize the use of corn for alcohol would be slightly higher than the cost of taking land out of production, but we would have the alcohol production.

Now to the point that the Congressman from New Mexico doesn't like. If we go beyond this 2 to 3 billion gallons, it does appear, and most of the research that has been done in USDA and universities around the country, indicates that we would experience significant grain price increases. It is important to note that those are world grain price increases. They are not just domestic grain price increases. That would mean that our grain exports would be reduced and we would have no choice but to face the food fuel issue head on. I really can see no rationale for permitting our

alcohol subsidies to grow to the point that alcohol production becomes that large, although we are a long way from there now.

My summary answer to your first question then is that the grain alcohol industry is not viable without a subsidy. With current subsidy levels, the industry is viable, and the corn used for alcohol contributes to a reduction in commodity program costs. For larger levels of alcohol production, crop exports would fall and food costs around the world would rise.

Your second question concerns the value of ethanol as a gasoline additive. I think that is a very important topic. The basic answer to the question is that we really don't know. There are lots of alternatives that could be used to replace alcohol. It is not clear at present how ethanol will stack up against those alternatives. We do know that companies in the oil industry are evaluating all the alternatives for replacing lead. Last year, in conjunction with a major oil company, we proposed to the Alcohol Fuels Office of DOE to do an estimation of alcohol demand as a fuel additive and to link the demand with all the other research that has been going on on agricultural supply so that we could estimate alcohol fuel potential as an additive with resulting impacts on agriculture. But that work was not funded. DOE didn't seem to feel the additive question was an important topic, so as of today we really don't have good information in the public sector to answer your question.

Another of your questions related to the contribution of the domestic ethanol industry to national security. One argument that can be made for developing domestic fuel supplies is that we are more secure as a nation with our own fuel supplies. The questions really are how much security do we want, what are we willing to pay for it, what level of oil import dependence and what's the cheapest way to obtain it.

Clearly, we can only substitute domestic higher cost liquid fuel sources for oil imports if we are willing to pay the difference in cost. That's what the current gasohol tax exemption does. So long as alcohol production stays below the 2- to 3-billion gallon range, it appears that the net cost of achieving this increased margin of security is rather low, although we do need to reestimate that under current conditions.

Your last question asked for an evaluation of H.R. 5727. I would like to make three main points on the gasohol tax exemption part of that.

First, I agree with the GAO report of June 6, 1984, which indicates the higher tax exemption is not needed to enable profitable alcohol production. The combined Federal and State subsidies amount, on average, to over $1 per gallon or $42 per barrel. Alcohol cost of production and gasoline price information indicate that the current subsidy is adequate.

Second, I find the timing of the subsidy in the bill not in line with promoting long-term investments in the alcohol industry. The subsidy schedule in the bill is 8 cents for 1985, 1986 and 1987, 7 cents in 1988, and 6 cents in 1989 through 1992, allowing for revision in line with the recent tax bill. Since it takes about 2 years to build an alcohol plant, the subsidy increase in 1985 and 1986 would be of little use or no use to potential new alcohol producers. New entrants would have an 8-cent subsidy in 1987, a 7-cent subsidy in

1988, and a 6-cent subsidy from 1989 through 1992. Under current law, they would have a 6-cent subsidy from 1987 through 1992. This small and short-term difference in subsidy would not be sufficient to change investment decisions and induce new entrants into the alcohol industry. A principal objective of the legislation—to increase alcohol production—I do not believe would be achieved.

The main effect of the higher subsidy would be to benefit existing alcohol producers. It could be that some less efficient producers who cannot compete in today's market would be able to go into production with the higher subsidy. Those producers generally are the smaller distillers with low alcohol yields and higher costs. I see no economic reason why the public should pay to keep inefficient producers in business. Most of the alcohol is produced in larger, more efficient plants, or in special case situations such as the distressed corn mentioned earlier. The main result of the higher subsidy would be to increase profits of those larger firms. There would be little change elsewhere.

The third point is that it is possible or likely that the main effect of the increased Federal subsidy would be reduced State subsidies. In that event, the effect of the legislation would be to transfer a portion of the total alcohol fuels subsidy cost from the State to the Federal Government.

That brings me back to the political issue or strategic issue I alluded to at the beginning. How should the cost of alcohol fuels subsidy be distributed? What fraction should be borne by the taxpayers of the entire Nation and what fraction by the taxpayers of the States where the corn is grown and the alcohol produced? Right now, the answer is a combination of the two and varies from State to State. If the majority in Congress believe that a high subsidy is justified, and that the Federal Government should pay a greater share of the cost, then some increase in the Federal subsidy may be warranted. Of course, you are in a much better position to make that judgment than I am.

Thank you.

[The prepared statement of Professor Tyner follows:]

TESTIMONY ON H.R. 5727 AND RELATED ISSUES

by

Wallace E. Tyner*

July 6, 1984

I appreciate the opportunity to come here today and present my views on H.R. 5727 and to comment generally on alcohol fuel policy issues. Let me state at the very beginning that my conclusion from an economic perspective is that the additional alcohol fuel subsidy provided by H.R. 5727 is neither needed nor desirable. There may be, however, political grounds for choosing to implement a higher subsidy, and I will discuss these briefly. In my testimony, I will attempt to provide answers to the questions you posed and to provide other information as appropriate.

Your first question concerns the near and long term viability of the U.S. ethanol industry and the impacts the industry might have on U.S. agriculture. The viability issue must be considered both with continued subsidies and without subsidies. Without subsidies I do not believe the grain ethanol industry is viable in the long run. Ethanol costs $1.60-$1.70 per gallon to produce with $3.50 corn, and $1.50-$1.60 with corn at $3.00 (where it is likely to be by fall). The New York bulk wholesale gasoline price today (July 3, 1984) is $.77 per gallon. The gasoline price would have to double and corn price remain constant for alcohol to be

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* Professor and Assistant Head for Research, Department of Agricultural Economics, Purdue University, W. Lafayette, Indiana.

competitive as a fuel. Both federal and state subsidies are needed today to make ethanol competitive.

Another important factor is that we have abundant reserves of competing fuels in the U.S. that will become economic if oil prices do rise significantly. In 1981 we completed a study for the Department of Transportation comparing, among other options, liquid fuels from biomass, shale oil, and coal.[1] Our conclusions at that time, and they haven't changed much in relative terms, were that shale oil and coal liquids both would be cheaper to produce than alcohol fuels from grain. Shale liquids were estimated to cost $40-$45 per barrel, coal liquids $50-$55, and grain alcohol about $63. We have huge reserves of both oil shale and coal, and if market conditions were encouraging, large amounts of liquid fuel production from these sources would be possible. It is interesting to note that the current federal subsidy level for ethanol (60 cents per gallon or $25 per barrel) would be adequate to induce production of shale oil liquids, even though it is not adequate for ethanol.

Long term viability of a subsidized ethanol industry depends of course on the level of the subsidy and of other prices and costs in the economy. If state and federal subsidies continue at roughly their current levels, my judgement is that the ethanol industry will continue to survive and grow. Combined federal and state subsidies currently average over $1.00 per gallon (60 cents federal and about 45 cents average for those states with subsidies) of ethanol. Research evidence suggests that this level is sufficient to permit a reasonable profit for efficient ethanol producers.

The next part of your question concerns the impacts of the U.S. ethanol industry on U.S. agriculture. My earlier research and the work of several other researchers has shown that about 2 billion gallons of ethanol could be produced before significant grain price increases were felt. The reason for this conclusion is that the U.S. has excess capacity in agriculture and can expand production up to that capacity limit with little or no increase in price. In fact, we now pay farmers not to produce (through PIK, set-asides, diversion payments, etc.), so the net cost of subsidizing grain alcohol is lower than the gross subsidy cost. In other words, each bushel of corn that is purchased on the market for alcohol conversion causes a reduction in the payments required to take land out of prooduction. The alcohol demand for corn also slightly narrows the gap between government support prices and market price, thereby lowering price based subsidy costs. At alcohol production levels up to 2 billion gallons, the impacts on agriculture would be minimal, but agricultural program costs would be reduced. In fact, producing the grain for alcohol could be viewed as at least a partial alternative to the current set of policies that support prices directly and constrain production. In 1979 we estimated that alcohol subsidy costs would roughly balance reduced agricultural commodity program costs.[2] Since that time, both the alcohol subsidy and commodity subsidy costs have increased substantially. I have not re-estimated the balance between alcohol subsidy costs and reduction in agricultural program costs under 1984 conditions, but it generally costs about 60 percent of the market price to take land out of production. It

appears that the total cost to subsidize use of corn for alcohol would be slightly higher than the cost of taking the land out of production, but we would have the alcohol production.

For alcohol production levels greater than 2 billion gallons, agricultural commodity prices are expected to increase, and with higher alcohol production levels, the increases could be quite large.[3] It is important to note that it is the world grain prices which would increase. So at these higher production levels, our commodity exports would fall. We would also be facing the food-fuel issue head-on. World grain prices and poor people's food costs would increase directly due to our alcohol production subsidies.[4] I can see no rationale for permitting our alcohol subsidies to grow to the point that alcohol production becomes that large.

In summary, my answer to your first question is that the grain ethanol industry is not viable without subsidy. With current subsidy levels, the industry is viable, and the corn used for alcohol contributes to some reduction in commodity program costs. For larger levels of alcohol production, crop exports would fall and food costs around the world would rise.

Your second question concerns the value of ethanol as a gasoline additive. That is a very important topic. The basic answer is that we really don't know. There are several alternatives to replace lead such as MTBE, methanol, ethanol, and TBA. It is not clear at present how ethanol will stack up against these and other alternatives. Companies in the oil industry are evaluating the alternatives for replacing lead now. Last year, we proposed to

the Alcohol Fuels Office of DOE to do an estimation of alcohol demand as a fuel additive and to link the demand work with all the other research we have completed on agricultural supply, so that we could estimate alcohol fuel potential as an additive and the resulting impacts on agriculture. The Alcohol Fuels Office responded that we had a good proposal, but that there was no need for the information on alcohol demand as a fuel additive. Current production of ethanol is around 400 million gallons per year. Under the most optimistic assumptions, the market for ethanol as an additive could be ten times that amount, so I believe it is an important issue. But, today, we really don't have good information in the public sector to answer your question.

Another of your questions related to the contribution of the domestic ethanol industry to national security. One argument that can be made for developing domestic fuel supplies is that we are more secure as a nation with our own fuel sources. In particular, it is argued, we are vulnerable if a portion of our oil supply comes from the politically unstable Middle-East. Fortunately, we depend today on a much lower fraction of our oil from Middle-Eastern OPEC countries than in the past. Nevertheless, the security argument is still, to some extent, valid. The questions are: how much security (what level of oil import dependence) do we want, what are we willing to pay for it, and what is the cheapest way to obtain it.[5]

Clearly, we can only substitute domestic higher cost liquid fuel sources for oil imports if we are willing to pay the difference in cost. That's what the current gasohol tax exemption does.

So long as the alcohol production stays below about 2 billion gallons per year, it appears that the net cost of achieving this increased margin of security is rather low, although we do need to re-estimate the cost under current conditions.

Your last question asked for an evaluation of H.R. 5727, which reduces the tax on blended fuels containing alcohol and increases the tax on leaded gasoline. With the proposed EPA regulations on leaded gasoline, I believe the tax increase on leaded gasoline is not necessary. Alternatively, you might consider a stiff tax on leaded gasoline (say 20-25 cents per gallon) aimed at incorporating into the gasoline price the social cost of ousing lead. Then the EPA regulations would not be needed.

I would like to make three main points on the gasohol tax exemption. First, I agree with the GAO report of June 6, 1984, which indicates the higher tax exemption is not needed to enable profitable alcohol production.[6] The combined federal and state tax exemptions amount, on average, to over $1 per gallon or $42 per barrel. Alcohol cost of production and gasoline price information indicate that the current subsidy is adequate.

Second, I find the timing of the subsidy not in line with promoting long term investments in the alcohol industry. The subsidy schedule in the bill is 8 cents for 1985, 1986, and 1987, 7 cents in 1988, and 6 cents in 1989 through 1992 (allowing for a revision in line with the recent tax bill). Since it takes about two years to build an alcohol plant, the subsidy increase in 1985 and 1986 would be of no use to potential new alcohol producers. New entrants would have an 8 cent subsidy in 1987, a 7 cent

subsidy in 1988, and a 6 cent subsidy from 1989 through 1992. Under current law they would have a 6 cent subsidy from 1987 through 1992. The small and short-term difference in subsidy would not be sufficient to change investment decisions and induce new entrants into the alcohol industry. A principle objective of the legislation -- to increase alcohol production -- would not be achieved.

The main effect of the higher subsidy would be to benefit existing alcohol producers. It could be that some less efficient producers who cannot compete in today's market would be able to go into production with the higher subsidy. Those producers generally are the small distillers with low alcohol yields and high costs. I see no economic reason why the public should pay to keep inefficient producers in business. Most of the alcohol is produced in larger, more efficient plants. The main result of the higher subsidy would be to increase profits of those firms. There would be little change elsewhere.

The third point is that it is possible or likely that the main effect of an increased federal subsidy would be reduced state subsidies. In that event, the effect of the legislation would be to transfer a portion of the total alcohol fuels subsidy cost from the state to the federal government.

This brings me back to the political issue I alluded to at the beginning of my testimony. How should the cost of the alcohol fuels subsidy be distributed? What fraction should be borne by the taxpayers of the entire nation and what fraction by the taxpayers of the states where the corn is grown and the alcohol produced? Right now, the answer is that it is a combination of the two, and varies from state to state. If the majority of Congress believe that a high subsidy is justified and that the federal government should pay a greater share of the cost, then some increase in the federal subsidy may be warranted. You are in a much better position than I am to make that political judgement.

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Footnotes

[1] Tyner, Wallace E., Binkley, James K., Matthews, Marie E., Whitford, Robert K. Transportation Energy Futures: Paths of Transition, Vol. 2 Benefits and Costs. Automotive Transportation Center and Department of Agricultural Economics, Purdue University (November 1981).

[2] Tyner, Wallace E., and Bottum, J. Carroll. Agricultural Energy Production: Economic and Policy Issues. Station Bulletin No. 240, Department of Agricultural Economics, Purdue University, September 1979.

[3] Meekhof, Ronald L.; Tyner, Wallace E.; and Holland, Forrest L. "U.S. Agricultural Policy and Gasohol: A Policy Simulation," American Journal of Agricultural Economics Vol. 62, No. 3 (August 1980), pp. 408-15.

[4] Tyner, Wallace E. "Food vs. Fuel? The Moral Issue in Using Corn for Ethanol," Technology Review Vol. 83, No. 7 (July 1981), pp. 76-77.

[5] Tyner, Wallace E., and Wright, Arthur W. "U.S. Energy Policy and Oil Independence: A Critique and a Proposal," Materials and Society, Vol. 2 (November 1978), pp. 15-22.

[6] Government Accounting Office. "Importance and Impact of Federal Alcohol Fuel Tax Incentives," GAO Report No. GAO/RCED-84-1, June 6, 1984.

Mr. DURBIN. Thank you, Professor Tyner. I may have a few questions at the end. [Laughter.]

At this point I would like to invite Professor Braden from the University of Illinois, Department of Agricultural Economics, to make a statement, if you have one, or you can defer and we'll ask questions—whatever would please Professor Hauser or Professor Braden.

Mr. BRADEN. Thank you, Congressman, for inviting us here this morning. Professor Hauser and I are here together. We were invited late and have not had time to prepare a statement. We plan to prepare one during the next couple of weeks for inclusion in the record.

I will turn to my colleague at my left. You will notice you have only "two-handed" economists here this morning, and Bob has some comments.

Mr. HAUSER. What I want to do is simply review why Professor Braden and I are here, and as Professor Braden says, we will be submitting a formal statement within the next couple of weeks.

The reason why we are here is because of something we did a couple of years ago for the Illinois Corn Growers Association. This was in response to a request for a study on the impacts of increased high fructose corn syrup and increased ethanol production on the price of corn and on other economic activities in Illinois.

Now, the price of corn impacts were evaluated on a national basis because the price impact of increases in ethanol production anywhere is going to have ramifications throughout the country, whereas the activity impacts were specific to Illinois.

At that time we basically discussed capacity estimates, future plans for production for both fructose and ethanol plants. Based on those discussions with industry representatives, we made some estimates of current production and forecasted production for the years 1980 through 1983.

Since that time, we believe that better estimates have been made. We did not worry about whether the economics of ethanol production were there. We simply said, if it's produced—we don't care why it's being produced or if it's being subsidized—if it's produced, what does that do to the price of corn.

We analyzed that impact in two contexts. The first scenario was sort of the shortrun context. If you just dumped all this ethanol on the market, what would that do to the market price of corn. The second context took into account the other adjustments which are going to take place as a result of that increased demand, those adjustments being decreased exports, an increase in corn acreage planted, and so forth. So what we did report—and I think—I don't see any of the reports left, but we brought a few copies. If you wish to see it, either contact us or the Illinois Corn Growers. What I did a couple of days ago was simply take what we thought were better estimates at this time, and specifically those were of Dr. Gill of the USDA, and based on his estimates of right around 150 to 170 million bushels of corn going into this ethanol industry right now, we simply used the same rough procedure that we used at that time to determine the shortrun and longrun impacts on corn price. The shortrun impact from an increase of 175 million bushels increase in demand we estimate runs from anywhere between 10 and 15

cents. The longer run impacts, after adjustments for this increase in demand, is closer to perhaps 5 to 7 cents. OK?

Now, a lot of things are going on at the same time, so this isn't any easy task to undertake. But based on some techniques which are used particularly by extension economists throughout the Midwest, we come up with those estimates.

We also estimate some economic activity impacts for Illinois by itself, and I would refer you to the paper to get more details on that.

With that brief statement, we will entertain any questions.

[The prepared statement of Mr. Hauser and Mr. Braden follows:]

Statement Submitted for the Joint Hearing

on Bill H. R. 5727

July 6, 1984

Decatur, Illinois

Corn Price Impacts of Current Ethanol Production[1]

The authors of this statement coauthored a report to the Illinois Corn Growers Association in June 1982, entitled "Economic Impacts of Corn Utilization in the Sweetner and Fuel Alcohol Industries." The report estimated the impacts of fuel alcohol (ethanol) and corn sweetner production during 1981-83 on: (a) short- and long-range U.S. corn price adjustments; (b) economic activity in Illinois; and (c) public revenue for Illinois. The purpose of this statement is to update our estimate of the impact of current ethanol production on the price of corn, using the methodology evident in the Illinois Corn Growers study.

Based on a recent estimate by Dr. Mohinder Gill[2] of the USDA and discussions with industry representatives, approximately 175 million bushels of corn will be used in the production of etharol during the 1983-84 crop year. In the absence of commodity price support programs, we estimate that the short-term impact of increasing corn demand for ethanol use by 175 million bushels would be a 10 to 15 cent per bushel increase in the price of corn. However, this short-term effect is not very relevant for two reasons.

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[1] The authors are Dr. Robert Hauser and Dr. John Braden, Department of Agricultural Economics, University of Illinois, Urbana-Champaign.

[2] Mohinder Gill, "Current Status and Near-Term Outlook for Alcohol Fuels From Grain." presented at the 1984 Eastern Economic Association, Park Central New York, March 16, 1984.

First, the estimate is under the assumption that all of the ethanol production considered comes on line fairly quickly (say, within one year) and, second, it is assumed that there are no adjustments in other agricultural sectors. As production increases slowly and as other sectors adjust, the price impact is dampened. For instance, in response to the initial increase in corn price, more corn would be planted, the quantity of corn demanded for export would decrease, and other feedgrains would be substituted for corn. When these types of reactions are taken into account, the 175 million bushel use is estimated to increase corn price by around six cents per bushel.

Our short- and long-range estimates are derived under the assumption that government programs are not effectively supporting the price of corn. During periods in which price floors are effective, the estimates presented above are probably too high.

At current ethanol production levels, the corn price effect is not very large. Maintenance at these levels through direct or indirect subsidy should probably not be done for price-enhancement reasons.

Mr. BRADEN. Can I make one footnote to those remarks?

Mr. DURBIN. Surely.

Mr. BRADEN. The price impacts that we estimated presume that Federal price support programs and commodity programs in general are not affected, so that any increase in demand for corn has a price impact. However, where there is oversupply and those programs are in effect, you can have an increase in demand without any very significant impact on prices. That is the more typical situation. Consequently, we would not expect to see the full kinds of price impacts estimated in the study, given the situation where the Federal commodity support programs are in effect.

[The report to the Illinois Corn Growers Association follows:]

Economic Impacts of Corn Utilization in the Sweetener and Fuel Alcohol Industries

Robert J. Hauser
John B. Braden*

June 1982

*The authors are assistant professors of agricultural economics, University of Illinois at Urbana-Champaign. This study was conducted in response to a request by the Illinois Corn Growers Association. Opinions expressed in this paper do not necessarily represent the opinions of the University of Illinois or the Illinois Corn Growers Association.

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The authors also wish to thank Darrel L. Good, Kristine Hauser, Frederic T. Leiner, David Reidenbach, Judith Seiss, and Robert N. Wisner for their assistance.

Executive Summary

Purpose

The objectives of this study are to examine the impacts of fuel alcohol (ethanol) and corn sweetener production during 1981-1983 in terms of 1) the short- and long-range effects on the U.S. average corn price, 2) the economic activity effects in Illinois, and 3) the public revenue implications for Illinois. The study was conducted for the Illinois Corn Growers Association.

Findings

It is estimated that corn usage for U.S. sweetener and ethanol production during 1980 and 1981 was 283 and 332 million bushels, respectively. Projected usage for 1982 and 1983 is 394 and 456 million bushels, respectively. Thus, the annual changes for the 1981-1983 period are 49, 62, and 62 million bushels.

Given that government programs which limit the effects of demand changes are not imposed, the following price impacts caused by corn usage in the sweetener and ethanol industries are estimated:

1. The increases in corn usage of 49, 62, and 62 million bushels during 1981, 1982, and 1983 cause short-term corn price increases of 3.7, 3.4, and 3.4 cents per bushel, respectively. The total short-term price change over the three year period is 10.5 cents. The short-term price increase caused by the estimated annual total corn usage of 456 million bushels during 1983 is estimated to be 25.1 cents per bushel.

2. Long-run price impacts of ethanol and sweetener production represent the lasting effects of these industries on commodity markets. These price impacts are determined after market adjustments to corn demand increases occur. The long-run corn price increase caused by the estimated 173 million bushel increase is estimated at 5.1 or 6.8 cents per bushel, depending on the method of analysis. The 5.1-6.8 cent change is in contrast to the short-run total change of 10.5 cents per bushel. The long-run corn price increase caused by the projected 456 million bushel total U.S. corn usage in 1983 is estimated to be 13.2 or 19.6 cents per bushel, depending on the method of analysis. This 13.2-19.6 cent range is in contrast to the short-term price effect of 25.1 cents per bushel.
3. Economic activity in Illinois, measured in terms of total income generated directly and indirectly by Illinois sweetener and ethanol firms, is estimated to be equal to $451, $536, and $578 million in 1981, 1982, and 1983, respectively.
4. State tax receipts generated by the economic activity caused by Illinois sweetener and ethanol firms are estimated to be $24, $29, and $31 million in 1981, 1982, and 1983, respectively. These estimates do not include any changes in property and fuel tax receipts.

Introduction

Corn usage for sweetener[1] and fuel alcohol (ethanol) production has increased dramatically during recent years. U.S. per capita corn sweetener consumption has grown from the 1972 level of 21.1 pounds[2] to 44.9 pounds in 1981. This nine-year growth of 23.8 pounds per capita was virtually all in the form of high-fructose corn syrup (HFCS). During the 1972-1981 period, HFCS consumption increased from 1.3 to 23.1 pounds per capita [13]. Ethanol production has offered another fast growing market for U.S. produced corn during the past two years. Ethanol plants started to come on line in 1979. During 1981, approximately 75 million gallons of ethanol were produced in the U.S.

In terms of corn utilization, the U.S. ethanol and sweetener industries used approximately 332 million bushels[3] of corn during 1981--representing nearly one-half of the non-feed domestic utilization. Illinois processing firms accounted for roughly one-third of the corn used for this purpose.

The objective of the following analysis is to estimate the impacts of ethanol and corn sweetener production during 1981-1983 in terms of:

1. the short- and long-range effects on the average national corn price;
2. the economic activity effects in Illinois; and
3. the public revenue implications for Illinois.

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[1]Corn sweeteners include high-fructose corn syrup, glucose syrup, and dextrose (refined corn sugar).

[2]Dry basis.

[3]Based on production levels of 101 million cwts. of corn sweetener and 75 million gallons of ethanol.

This study responded to a request by the Illinois Corn Growers Association for an objective analysis regarding the current and potential economic importance of the sweetener and ethanol industries to Illinois.

Industry Description

Data regarding plant, regional, and total production capacity and actual production of ethanol and corn sweeteners are estimated by using published government and industry documents and information gathered through consultations with industry representatives. Table 1 summarizes our 1980-1983 annual corn utilization estimates for the sweetener and ethanol industries in Illinois and the U.S.

Table 1. Estimated annual corn input capacity and utilization by the ethanol and corn sweetener industries in millions of bushels, 1980-1983

	1980		1981		1982		1983	
	Capacity[a]	Usage	Capacity[a]	Usage	Capacity[a]	Usage	Capacity[a]	Usage
Ethanol[b]								
U.S.	30	12	50	30	108	62	156	93
Illinois	24	10	26	21	57	35	63	45
Sweeteners								
U.S.	345	271	393	302	414	332	414	363
Illinois	99	89	99	89	105	95	105	95
TOTAL								
U.S.	375	283	443	332	522	394	570	456
Illinois	123	99	125	110	162	130	168	140

[a]End of year effective capacity.

[b]Includes only plants using corn feedstock.

Ethanol production capacities are based primarily on data published by Information Resources Incorporated [8]. The data are modified to reflect

more current operational estimates and expansion plans. Capacity modifications are based on discussions with industry representatives. Utilization estimates are determined by plant for relatively large firms whereas the smaller plants are assumed to operate at 40 to 50 percent of capacity. Capacity and production estimates for ethanol plants are usually in terms of gallons; the conversion rate of one bushel per 2.5 gallons of ethanol is used to determine equivalent corn input.

Total U.S. corn sweetener production is based on USDA per capita consumption estimates [13]. The U.S. per capita consumption level of 44.9 pounds is used for 1981. An annual increase of four pounds (equal to the HFCS increase from 1980 to 1981) is assumed for 1982 and 1983. These per capita consumption estimates are multiplied by the respective midyear population estimates [14] (projected population is at a one percent growth rate) to determine total U.S. corn sweetener production.

U.S. sweetener capacity estimates are based on data published by Drexel Burnham Lambert, Inc.[3] and consultation with industry representatives. The listed capacities represent effective capacities.

Sweetener plant capacities for Illinois are based on data provided by industry sources. Production levels are assumed to be at 90 percent of effective capacity.

According to the figures in Table 1, the average U.S. corn sweetener plant currently operates at about 80 percent of its effective capacity and will operate close to 90 percent in 1983. There is some concern in the industry regarding the accuracy of the corn sweetener consumption levels (hence our production estimates) reported by USDA due to the incomplete nature of the data reported to USDA [13]. Many industry representatives believe that the sweetener industry is currently using

about 90 percent of its production capacity. The authors recognize that the total U.S. sweetener production levels reported in Table 1 may be understated but believe that the annual changes in U.S. production and the corn usage estimates for Illinois are very reasonable.

Price Impacts

The impact on corn price of sweetener and ethanol production is analyzed under two perspectives. First, the immediate, short-run price impact from increasing corn demand is considered. Second, a longer run price effect is examined to provide for adjustments made by other sectors in response to short-run impacts. For instance, the immediate ramifications of a corn demand increase by the ethanol and sweetener industries might include an increase in corn price due to the increase in corn demand and a decrease in soybean price due to the increase in high-protein feed-supplements in the form of gluten feed and meal byproducts. The new corn/soybean price relationship would encourage the replacement of soybean acres with corn acres--increasing the supply of corn and dampening the initial increase in corn price. Latent responses might also include a reduction in export and feedgrain demands which would also mitigate the initial price impact of increasing corn usage in the sweetener and ethanol industries.

The short-run price impacts for 1981-1983 are determined under the corn supply-demand context presented in Table 2. The determination of corn usage for sweetener and ethanol was discussed in the previous section. The remaining figures in Table 2 for 1980/81 and 1981/82 are obtained from Outlook Update [4].

For 1982/83, a total of 81.5 million acres of corn is assumed to be planted with an average yield of 105 bushels per acre. Total corn production

Table 2. Estimated U.S. corn supply and demand in millions of bushels, 1980/81-1982/83

	1979/80	1980/81	1981/82	1982/83
Supply				
Carryin	1304	1617	1034	1876
Production	7939	6645	8201	7530
TOTAL SUPPLY[a]	9244	8263	9236	9406
Use				
Export	2433	2355	2175	2300[c]
Feed	4519	4139	4400	4475[c]
Sweetener	271	302	332	363
Ethanol	12	30	62	93
Other[b]	404	403	391	399
TOTAL USE	7627	7229	7360	7630
Carryover	1617	1034	1876	1776
U.S. Average Price	$2.52	$3.10	$2.55[c]	$2.60[c]

[a]Includes imports.

[b]Includes seed and other industrial products.

[c]As estimated by D. L. Good, University of Illinois.

implied by these acreage and yield estimates is reduced by 12 percent due to loss and non-grain harvest. Exports and feed demands are set according to estimates by D. L. Good, University of Illinois. Feed demand is increased because of the expected increase in hog production. Corn exports reflect the levels that existed before the current crop year.

Short-run corn price impacts are based on discussions with R. N. Wisner, Iowa State University, and D. L. Good. Given the supply/demand conditions that are estimated for the 1980-1983 period, the proportional change in demand (using total supply as the base) multiplied by 2.0 will yield the proportional change in U.S. average price. This procedure implies the following short-run price impacts that are attributable to ethanol and sweeteners:

1. 1980/81—A ten million bushel increase in corn utilization caused a .75 cent per bushel increase in the price of corn. Approximately 283 million bushels were used in the sweetener and ethanol industries during the 1979/80 crop year. Therefore, the 1980/81 utilization represents an increase of 49 million bushels. The impact of this additional 49 million bushels was to increase the national average price by roughly 3.7 cents per bushel.
2. 1981/82—A ten million bushel increase in corn utilization would cause a .55 cent per bushel increase in the price of corn. The 62 million bushel market expansion due to additional ethanol and sweetener production during 1982 implies a 3.4 cent per bushel increase in the price of corn.

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3. 1982-83--A ten million bushel increase in corn utilization will cause a .55 cent per bushel increase in the price of corn. The 62 million bushel market expansion due to additional ethanol and sweetener production during 1983 implies a 3.4 cent per bushel increase in the price of corn.

The above multipliers may also be used to estimate the price impacts of the total sweetener and ethanol corn usage of 332, 394, and 456 million bushels in 1980/81, 1981/82, and 1982/83 respectively. These totals imply price effects equal to 24.9, 21.7, and 25.1 cents per bushel for 1980/81, 1981/82, and 1982/83, respectively.

Two points of caution concerning the interpretation of these price impacts are advised. First, our estimates are based on an assumption that prices change freely in the market. Where a price floor or ceiling is effective, an increase in demand will not have the full price impact indicated above. Price limits that are potentially relevant to our analysis are caused by government loan and price programs which effectively set price floors. Second, the price impacts imply that there is no response by corn producers and users after the price increase transpires. That is, the price impacts are determined while holding everything else constant. This is not realistic. Rather, other sectors would react to the price change and their reactions would dampen corn price increases. For instance, an increase in corn price should decrease the quantities demanded by foreign clients and domestic livestock feeders; an increase in planted corn acreage could be the producers' response. The results of Hertzmark, Ray, and Parvin [5] and Womack, Johnson, Meyers, Matthews, and Young [19] are used to

provide two estimates of these long-run response impacts.

Hertzmark et al. used the POLYSIM simultaneous equation model to estimate the impact of various levels of future ethanol production on crop prices, acres planted, exports, and other factors. The model simulates the reactions that would occur within and between various sectors when additional corn demand is added to the market from 1979 to 1983. The Womack et al. model consists of a set of simultaneous equations that explain crop price changes and feed quantity demands. Empirical data is used to measure past price impact multipliers of supply and demand variables.

Our long-run price analysis examines the price effects of two levels of increased demand. The first level (173 million bushels) is equal to the estimated increase in sweetener and ethanol corn usage from 1980 to 1983. The second level (456 million bushels) is equal to the estimated total corn usage in 1983. Let us first examine the price implications of these levels by using the Hertzmark et al. results.

Hertzmark et al. derived six separate solutions. Each solution assumes a particular level of corn usage increase in the ethanol industry from 1979 to 1980. The corn usage levels are equal to 80, 140, 200, 300, 400, and 1200 million bushels. Our analysis assumes that an additional bushel of corn required for ethanol production will have the same substitution and price effects as an additional bushel of corn used by the sweetener industry. Our 176 bushel increase impacts are found through interpolation between the results of the 140 and 200 million bushel solutions of the Hertzmark et al. model. Our 456 million bushel increase impacts are based on trend continuation implications between Hertzmark et al.'s 300 and 400 million bushel solutions. That is, we computed

percentage increases between these scenarios for the variables and extrapolated those percentage increases to the 456 million bushel case. For example, a 33 percent increase in corn usage between the two Hertzmark et al. scenarios prompted a 1.17 percent (3.0 cents) increase in corn prices. When applied to the 14 percent difference between 400 and 456 million bushels, this price sensitivity would yield an additional increase of 0.5 percent (1.3 cents) above the corn price associated with the 400 million bushel scenario. The 176 and 456 million bushel results are presented in Table 3.

The yearly price effects of adding 173 million bushels of demand from 1981-1983 were 3.7, 3.4, and 3.4 cents per bushel or, in total, 10.5 cents. The long-run price increase of adding the 173 million bushel demand is 5.1 cents. The long-run mitigating effects on corn price are due primarily to the decrease in corn export and feed demand and the increase in production. The 173 million bushel increase for ethanol and sweetener production is offset by a 109 million bushel decrease in exports and feed use and an increase in corn production of 26 million bushels. Furthermore, the average U.S. price of soybeans is projected to increase slightly because of the substitution effect in which land is planted in corn rather than soybeans. U.S. net farm income is estimated to increase by $626 million.

The short-term price impact of the estimated 1983 total corn usage of 456 million bushels is 25.1 cents per bushel. The long-run price impact is estimated to be 13.2 cents and the increase in U.S. net farm income is estimated to increase by $1,629 million.

It should be noted that the Hertzmark et al. results are much more amenable to inferences regarding our 173 million bushel scenario than

Table 3. Estimated impacts of an additional 173 and 456 million bushel corn usage in the ethanol and sweetener industries on selected variables of the POLYSIM model

Variable	Unit	Impact of additional demand	
		173 million bushels	456 million bushels
Corn			
Price	Dol./bu.	.051	.132
Exports	Mil. bu.	-28.62	-73.19
Feed	Mil. bu.	-80.83	-206.77
Acres	Mil. ac.	.248	.628
Soybeans			
Price	Dol./bu.	.01	.028
Exports	Mil. bu.	-1.08	-2.52
Acres	Mil. ac.	-.22	-.55
Soybean meal			
Price	Dol./tn.	-5.8	-14.8
Exports	Thous.tn.	127.6	327.2
Livestock cash receipts	Mil. dol.	375.4	953.0
Crop cash receipts	Mil. dol.	281.1	730.0
Net farm income	Mil. dol.	625.8	1,629.0

our 456 million bushel scenario. The reason for this is that our 173 million bushel increase is added in increments to the sweetener and ethanol corn usage that already existed in 1980. This is very similar to the process that occurs in the Hertzmark model. In contrast, our 456 million bushel scenario assumes, in a sense, that no sweetener and ethanol corn usage existed in 1979 and that the entire amount is added to the market by 1983.

Another estimate of the long-run price impact is estimated by using the price-impact multipliers presented by Womack et al. Variable changes that are implied by the Hertzmark et al. results are used in conjunction with the multipliers of Womack et al. in determining the price impacts that are presented in Table 4.

The long-run price increases determined by using the Womack et al. model are 6.8 and 19.6 cents per bushel for additional demands of 173 and 456 million bushels, respectively.

In summary, the estimated increase in corn usage of 49, 62, and 62 million bushels during 1981, 1982, and 1983, respectively, causes price increases of 3.7, 3.4, and 3.4 cents per bushel per year. The total price change across the three years in this short-term context is 10.5 cents. The same demand increases analyzed in a context where longer-run responses are allowed yield price impacts of 5.1 and 6.8 cents, depending on the method of analysis.

The short-term price increases caused by the estimated total corn usage of 332, 394, and 456 million bushels are estimated to be equal to 24.9, 21.7, and 25.1 cents per bushel, respectively. The long-run price increase caused by a 456 million bushel demand is estimated to

Table 4. Estimated price impacts determined by using Womack et al. multipliers and POLYSIM variable changes caused by the increase in sweetener and ethanol corn usage

Variable	Multiplier[a]	Variable change in millions of bushels		Price effect cents per bushel	
		173 million bushels	456 million bushels	173 million bushels	456 million bushels
Corn					
Supply	-.16	26.0[b]	65.9[b]	-4.16	-10.54
Exports	.17	-28.6	-73.2	-4.86	-12.44
Feed	.16[c]	-80.8	-206.8	-12.93	-33.09
Sweetener	.16[d]	92.0	363.0	14.72	58.08
Ethanol	.16	81.0	93.0	12.96	14.88
Soybeans					
Supply	-.20	-6.6[e]	-16.5[e]	1.32	3.3
Exports	.22	-1.1	-2.5	-.24	-.55
NET EFFECT				6.81	19.64

[a]Unit measurement is in dollars per 100 million bushel change.

[b]Assumes 105 bushels per acre.

[c]Womack et al. describe feed effects through livestock numbers and prices; we are assuming a multiplier that is equal to the supply and ethanol multipliers.

[d]Assumed to be equal to ethanol's multiplier.

[e]Assumes 30 bushels per acre.

be either 13.2 or 19.6 cents per bushel, depending on the method of analysis.

Economic Activity Impacts

The estimated increase in economic activity generated from ethanol and sweetener production is based on the increase in resource utilization. Resource utilization is measured by examining factor payments.

Our analysis of increased economic activity concerns only the state of Illinois. The previous section examined price impacts of estimated corn usage in the U.S. sweetener and ethanol industries. In contrast, this section examines the economic activity implications of corn usage that is estimated for the sweetener and ethanol plants in Illinois.

Income effects are determined by comparing the product values of the sweetener and ethanol industries with the input value of corn being used. The margin between the output and input values represent payments to labor, energy, machinery, and other factors of ethanol and sweetener production.

Assume, for example, that there are two major outlets for the corn grown in the Decatur area. One outlet is the grain merchandizer who buys, stores, and transports the grain to export ports. The second market is the corn processor who buys, stores, processes, and transports the processed corn. The major difference between the two markets is that the corn is handled and transformed to a much greater extent in the processing industry. The extent of the activity that occurs in the processing market which does not occur in the export market is measured by the value added to a bushel of corn during processing, i.e., the difference between the corn price as an input and the price of the corn as an output in the

processing industry.

The procedure of using value-added margins to determine income effects assumes that the corn that is being used for sweetener and ethanol would have been used in another type of market at the same input price. It seems reasonable to assume that in Illinois, especially in the areas where corn processing occurs, corn production levels will be about the same whether processing expansion occurs or not because of the strong export market that faces Illinois-produced corn. Therefore, for our analysis, we are assuming that the corn that is used by Illinois processing industries would go to export ports in lieu of processing if the processing market did not exist. If one assumes that 1) the merchandizers and processors are bidding for the same corn and 2) the handling and transportation costs involved in moving export-bound corn versus processed corn are approximately equal, then a fairly good method of determining increased income due to processing is to estimate the processing (value-added) margins.

Table 5 presents the estimated output-input margins of the ethanol and sweetener industries and the respective income effects for Illinois.

Table 5. Income effect in Illinois of ethanol and sweetener production in millions of dollars, 1981-1983

	1981	1982	1983
Ethanol output-input margin	60.1	100.1	128.7
Sweetener output-input margin	240.3	256.5	256.5
TOTAL margin	300.4	356.6	385.2
Multiplier	2.1	2.1	2.1
TOTAL income effect	630.8	748.8	808.9

The ethanol margin is based on study results of Resource Planning Associates, Inc. [15]. For Illinois, the per bushel margin is equal to $2.86, i.e., for every bushel of corn that goes into an ethanol plant, $2.86 worth of resources are added to it in producing ethanol and ethanol byproducts.

Sweetener margins are based on discussions with industry representatives. Virtually all of the sweetener expansion during the 1981-83 period is in the form of HFCS. Thus margins are estimated for the HFCS industry. The average margin in this case is equal to $2.70 per bushel.

The ethanol and sweetener output-input margins shown in Table 5 are found by multiplying the average margin per bushel of each industry by the respective estimated bushel increase in corn usage for each year.

The total income effect is determined by multiplying the total margins by 2.1 [15]. This is done because of the iterative effect that an additional dollar's worth of output has in the economy. A portion of the initial addition of income will be spent by the income recipient--creating more production in other sectors which generates more income and the process continues.

The above procedure for measuring economic activity in Illinois has the following implicit assumptions:

1. Factors of production that are reflected by the margins would not be employed in the state if processing did not occur.
2. The factors of production are being provided by Illinois residents and all of the multiplier effect occurs within Illinois.

An exact procedure for estimating activity through the use margins would include adjustments that 1) net out the portion of the margin which represents factor payments that would result from other forms of production, 2) net out the portion of the margin that represents income distributed to out-of-state recipients (who presumably spend this income out of Illinois) and 3) net out the multiplier effect that should not pertain to Illinois due to out-of-state spending.

Two significant factors would tend to lessen the economic activity effects that are estimated above. The first factor is the amount of wages and salaries that would be received by sweetener and ethanol employees from other Illinois employers if the employees were drawn from other jobs. The second consideration is the amount of energy resources that are being supplied by out-of-state firms.

According to industry data, energy payments account for approximately 18 percent of the processing margin. About 70 percent of the energy is supplied by out-of-state producers--implying that approximately 12.5 percent of the margin should be netted out due to out-of-state energy payments.

Wages and salaries for plant operation (which does not include wages and salaries for such things as contracted construction) represent about 20 percent of the processing margin. Assumptions regarding what would happen to this labor in the absence of the sweetener or ethanol industries are admittedly heroic. But, in order to estimate the employment impacts, the following responses are assumed to occur in the event of ethanol/sweetener plant shutdowns:

1. Ten percent of the employees would move out-of-state.
2. Ten percent of the employees would stay in Illinois but not find jobs.

The above assumptions imply that 80 percent of the total wages and salaries paid by the sweetener and ethanol industries in Illinois would be paid by other Illinois firms in the absence of the sweetener and ethanol firms. Therefore, 80 percent of the wage and salary component of the processing margin should be excluded when determining economic activity effects. If wages and salaries account for 20 percent of the total margin then a 80 percent reduction in these payments means the total margin is reduced by 16 percent.

Table 6 presents the economic activity effects after energy and labor adjustments are made. The margins reported in Table 5 are reduced by 28.5 percent (12.5 for energy and 16.0 for labor) to determine the margins ir Table 6.

Table 6. Income effect in Illinois of ethanol and sweetener production after labor and energy adjustments in millions of dollars, 1981-1983

	1981	1982	1983
Ethanol output-input margin	43.0	71.6	92.0
Sweetener output-input margin	171.8	183.4	183.4
TOTAL margin	214.8	255.0	275.4
Multiplier	2.1	2.1	2.1
TOTAL income effect	451.1	535.5	578.3

Public Revenue Impacts

The increase in public revenues generated by Illinois sweetener and ethanol production is based on the economic activity estimates of the previous section.

Resource Planning Associates, Inc. [15] reported that state tax receipts average 5.4 percent of economic activity in Illinois. Using the total income effect estimates presented in Tables 5 and 6, direct and indirect tax receipts can be determined that are attributable to the Illinois sweetener and ethanol industries. Table 7 presents the tax receipt estimates. After providing for offset labor payments and out-of-state energy payments, the estimated state tax receipt increases are $24.4, $28.9, and $31.2 million in 1981, 1982, and 1983, respectively.

The estimated increase in state tax receipts does not include any increase in property tax receipts. Property tax payments vary considerably by location. They also are frequently subject to special industrial development tax allowances. Though they may be significant sources of revenues to a community, they are not likely to be very significant from a state-wide perspective.

Our revenue estimates also omit impacts of state sales or fuel excise tax exemptions for fuel alcohol used in Illinois. In 1980, Illinois allowed for a four percent sales tax exemption for each gallon of gasohol (10 percent ethanol mixture). This allowance decreases to three percent in 1982, two percent in 1983, one percent in 1984, and expires in 1985. The implied value of these tax exemptions per gallon of ethanol is ten times the value per gallon of gasohol because of the 10 percent ethanol mixture. The U.S. Department of Energy [17] reported sales of 57 million

gallons of gasohol (5.7 million gallons of ethanol) in Illinois in 1981. Assuming this increases to 100 million gallons of gasohol (10 million gallons of ethanol) in 1982 and the average gasohol price is $1.30 per gallon, a three percent exemption in 1982 will cost the state $390,000. However, it should be noted that the Illinois exemption, and those of 32 other states, contribute greatly to the profitability of the ethanol industry. As a major ethanol producing state, Illinois experiences considerable net gains from corporate income tax receipts deriving from corporate revenues that are boosted by other states' fuel and sales tax exemptions.

Table 7. Estimated Illinois state-tax receipts due to Illinois sweetener and ethanol production in millions of dollars, 1981-1983

	1981		1982		1983	
	Gross margins[a]	Net margins[b]	Gross margins[a]	Net margins[b]	Gross margins[a]	Net margins[b]
Total income effect	630.8	451.1	748.8	535.5	808.9	578.3
State receipts as a percent of economic activity	5.4	5.4	5.4	5.4	5.4	5.4
Increase in state receipts	34.1	24.4	40.4	28.9	43.7	31.2

[a]Based on figures presented in Table 5.

[b]Based on figures presented in Table 6.

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Mr. DURBIN. At this point I would like to allow my colleague, Mr. Skeen from New Mexico, who may have to dart out of here, the opportunity to ask questions first.

Joe?

Mr. SKEEN. Thank you very much, Dick. I hate to hit and run and I want to take a shot at Professor Tyner.

The statements that you made are very valid and I couldn't agree more—of course, we've got a situation here—and I think you have made it an all-inclusive statement. It was very well done. I do take exception to some of the premises in the work, but that's what makes good conversation and that's what we're here for.

Of course, most of these subsidies that we have talked about, be they State or Federal or whatever, I think were in support to initiate an entirely new industry. Given that thought—and I think Dick's bill does the same thing. It recognizes that this is a very difficult thing to initiate. So it had startup benefits, tax benefits, and so on.

But to go down to the statement you made, that at a certain level of production—and you do get into this business of your inflating the cost of the agricultural product to the point where you will raise food costs—therein I have a lot of problem with that assumption. Because, first of all, traditionally, the agricultural products have been too doggoned low for too doggoned long. If you can't recover costs of an agricultural product, which most farmers can't today—we were just sitting here talking, and I asked, at $3 a bushel, can a farmer recover his costs? Is that No. 1 corn, or whatever. But anyway, for top corn. If you put land cost or something else in there, you can't—you're not recovering costs in this thing. Also, given the fact that most foodstuffs that we have in the United States you could give the agricultural product or its cost to the manufacturer and it would not have a great impact on his end-product cost.

That's the things that are bothering us, that we get so worried about inflating the base agricultural product, and when we're talking about this instance of producing alcohol from it, I think that that's overstated and an overreaction to this thing. That has been my problem with economic treaties on this thing, because it is an element. I certainly give you that, and it is one that should be considered. But I think it is terribly overstated because the agricultural products of the United States today, by and large, are drastically underpriced, where they ought to be. The consumer is the one who has been subsidized, not the producer of the agricultural product. We have done that——

[Applause.]

Mr. SKEEN. And I'm not even running here. [Laughter.]

Mr. DURBIN. I'm glad.

Mr. SKEEN. But I love to—and you folks who deal in economics every day, you have to take all of these elements, and I recognize that, and it makes a good argument. But boy, I still have to go back to saying that we do have to consider, too, that you're given the fact that a product costs so much, you roll it into your estimates and so forth, and then if we do increase that production and we do increase those costs, then all of a sudden we start talking about inflating the cost of foodstuffs to people in the United States. I think

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the capacity for production in the agricultural community is such that we could ride that out and there is not that much impact and it is somewhat overstated.

I do respect economists very much.

Professor TYNER. Could I just make one comment?

Mr. SKEEN. Surely. I would like your response.

Professor TYNER. Well, first of all, it is important to remember, I think, that that's way off. It's a very high level of production. It's beyond——

Mr. SKEEN. This is all hypothesis.

Professor TYNER. Yes; it's a high level of production, and I think the most important consequence, if we got to that level of production, is not so much the price, but it is what would happen to exports. Basically, we would be cutting off our corn exports to diminish our oil imports. And so it's what happens in the trade market, because when the prices go up our exports would go down and agriculture wouldn't be any better off, whether we export the grain or whether we make it into alcohol. So the real danger is again, far out, but the real danger is what we do to our export markets.

Mr. SKEEN. I would like to see us in that danger, where we're not dependent on imports, and where we are at least producing—that we are getting costs—we are reclaiming costs in agricultural production today. But I do certainly respect your—the hypothesis is interesting. I hope we can get to that point where we start worrying about that.

Professor TYNER. We're a long way from there now.

Mr. SKEEN. Yes, we are.

Thank you all very much. I appreciate your kindness.

Mr. DURBIN. Thank you for coming by. We appreciate it.

Mr. SKEEN. We're getting the chili ready for you. [Laughter.]

Mr. DURBIN. Paul Simon, any questions for the panel?

Mr. SIMON. Yes; Professor Tyner, I'm curious. Your assumption is that there is no improvement in technology; the technology pretty much maintains its present level; is that correct?

Professor TYNER. You're talking about alcohol fuel technology?

Mr. SIMON. Yes.

Professor TYNER. Well, the study we did when we compared alcohol fuels with coal and shale had some presumptions that the cellulose technology would come into being in the early nineties, that that would become commercial in the early nineties. But we didn't—beyond the cellulose technology and the reductions, drastic reductions in the cost of that technology, we didn't have any other major—

Mr. SIMON. But in the ethanol field, your assumption is the present level of technology?

Professor TYNER. With minor change, with minor modifications. No drastic changes in the current technology.

Mr. SIMON. Is there any indirect benefit for the United States in having the major oil companies know that there are options available, that there is an indirect lowering or pressure to keep lower the oil prices of the world?

Professor TYNER. Well, I'm not sure what you're leading to. I don't know that an alcohol industry at that subsidy level would provide that.

Mr. SIMON. Well, in other words, if the major oil companies of the world—if Standard Oil of California, which has just gobbled up Gulf, who gobbled up somebody else and so forth—if they know that there are alternative fuel sources available, does that—and I will direct this to all three of you—does that in any way diminish the likelihood of an escalation in oil prices?

Professor TYNER. The existence of a backstop, of something you can go to when prices hit a ceiling, certainly provides a resistance to higher prices. I'm not sure how much of a backstop is provided by an industry this small.

Mr. SIMON. I'm not suggesting that you can quantify it. But, in fact, then, there is another benefit, other than the benefits that you mention in your statement, indirectly to the people of the Nation?

Professor TYNER. Oh, I think there are significant benefits. I think the main area is in agricultural policy. I think that if Congress decides that it's really serious about this, we have the 1985 farm bill coming up next year, and you have an opportunity to try and integrate energy policy and agricultural policy in an even more refined or more serious way than it has been in the past. I'm not sure that a set of subsidies in an industry created to expire in 1992 provides a very serious signal to the rest of the world that we're going to be in this for the long term. The real alternative in ethanol I think is to make it an integral part of agricultural policy.

There are some costs; there are some social costs. You have some soil erosion that's going to go on that wouldn't go on if you retired that land. But if you choose, as a political decision, to use that land and to use those funds that you would have paid farmers not to grow, up to that limit, to let them grow and convert that to alcohol, I think that's a viable policy route.

Now, so far, the measures of the movements in that direction have been token. Not many people are going to go into the business with 6-cent or 10-cent subsidies that are going to expire in 6 years, by the time they get a plant built. So I think that's what is the key issue here, in my opinion.

Mr. SIMON. Thank you.

Mr. DURBIN. Thank you very much, Paul.

I might add something here that many people may not realize sitting here in Decatur with this panel. When I came to Washington and was fortunate enough to be appointed to the Agriculture Committee, one of the first things that I did was to look around in Washington, DC, which is a city replete with consultants and experts, to find out where the "think tank" was for agricultural economics. When I went to places like the Brookings Institution, which has a national if not international reputation for expertise and research and various issues of Government, I found there was not one single agricultural economist there. As you look around in Washington, DC, our Nation's Capital, where we chart the course for American agriculture, or at least try to, it is very difficult to find the level of expertise that we can find within 100 miles of Decatur, IL.

I commend these gentlemen for joining us this morning and I applaud their efforts in analyzing some very difficult and challenging issues. There are a couple of things I would like to raise as ques-

tions, first I guess to Professor Tyner, who has had the good fortune of questioning the wisdom of my legislation. [Laughter.] Let me say I have listened very closely.

A couple of things do concern me. One is, I think it would not be proper or correct for us to suggest that the Federal Government has not taken on, as a matter of national policy, year in and year out, over several decades, some type of subsidy to the development of energy in this country. We do it all the time. I find, as a member of the Science and Technology Committee, that Paul Simon and I are often going to bat for Illinois coal, to give it a chance to get back on its feet, and we're fighting the nuclear industry which is coming in and saying "we want subsidies; we want help, we want research."

Professor TYNER. They've had it for a long time.

Mr. DURBIN. They've had it for a long time. If you're talking about whether that's cost effective, we'll have another congressional hearing on that particular subject.

But what I am suggesting to you is that many times we as a nation have decided that sometimes it may not be immediately cost effective in the short term for us to subsidize energy growth, energy industry, but in the long term it is something we have to invest in, for fear that the day will come and we'll need it and won't have it.

Ethanol seems to me, even though you can make good short-term arguments—I think the whole panel has—short-term arguments for the fact that it would increase the cost of grain, short-term arguments as to whether or not the subsidy is immediately effective, if we can look beyond tomorrow or 4 years to where we want to be 10 years from now, if the administration goes through with its promise by 1988, whoever might be in power, of removing lead from gasoline for all intents and purposes, where are we going to have the octane additive, where are we going to make up the 2 or 3 percent of our oil supply coming from the Mid East if it breaks out into a war?

Don't we have to at some point say these are good, concise, neat, and compact economic arguments? But from the policy viewpoint as a nation, for the good of agriculture and for the good of our energy supply, perhaps we have to subsidize the industry to get it rolling and on its feet for the future course of action. How much did you take that into account as you analyzed this program?

Professor TYNER. Any time that you want to target an industry for national security reasons or any other reasons, political reasons, for special consideration, for protection, I find lots of cases where there are valid arguments to do that. I think the national security arguments in the oil area are valid.

I think there are other ways that you should consider at least for achieving that national security. We have a lot of energy sources in this country, and all of them aren't—you know, I'm from Indiana and you're from Illinois, and they are not all here. But we do have coal in both of those States and we have an abundance of coal in this country. We have shale oil in this area, mainly out in the West. We have lots of energy resources in this country, and none of them are going to come on unless the price is right.

I would personally like to see you consider some sort of price guarantee system that lets the market decide which of these would come on. You guarantee a price and the market decides which of these energy sources come on. We are more secure, but we are more secure at a lower cost perhaps.

Mr. DURBIN. Could you describe that a little more, what you mean by a price guarantee?

Professor TYNER. It's a guarantee that you could operate in any number of different ways. I testified back in 1978 on some ways that it might operate—a National Security Act. One way it could work is you have an auction in the private sector for the right to produce. How much would you require? Would you require $40 a barrel, $45 a barrel, $50 a barrel? What would you require that we guarantee you over the next 25 years or whatever to produce this material, whether it's alcohol or shale oil liquids or coal liquids or methanol or whatever it may be. You let the private sector compete for that price guarantee. You are providing a price guarantee which, in essence, is the national security cost, the premium. You're saying that we, as a nation, are better off if we have some of this technology in place and going. I agree with that, but I would like to see us look at other ways to do it cheaper.

So I think there are valid national security arguments, and I think in the case of alcohol, up to that 2- or 3-billion-gallon level, we have a valid argument in the sense that we reduce our costs for agricultural policy. I mean, we can almost eliminate the cost based on the 1979 numbers. But no, I don't disagree at all, that there are times when we need to look at nonmarket alternatives, but we ought to look at a lot of options on how to do it.

Mr. SIMON. If my colleague would yield, what about, instead of doing this bid way that you suggest, which is going to get the big operators in and, frankly, eliminates most of the smaller operators, what if we did it like we do target prices in agriculture, where we would guarantee, using the Grafs' figure, you guarantee $1.50 a gallon, and then, you know, if the market price is $1.22 a gallon, then there is that 28-cent subsidy or whatever. Does that——

Professor TYNER. I think if you have a political objective to encourage all scales, and you want to have a part of a program like that, that would be allocated to the smaller scales, that would be appropriate. That's really a political question, as to how important is it to have a variety of scales represented. But if that's the political judgment, then that would be appropriate.

Mr. DURBIN. Do the gentlemen have any comments on——

Mr. BRADEN. I at least want to acknowledge that Professor Tyner is a man with a great deal of experience and wisdom in this field, and we commend his judgment on these matters.

Mr. DURBIN. We just want to straighten him out on one bill. [Laughter.]

There is one other thing that I think bears mentioning in our research materials for this hearing. I would like to share just a few statistics. This is your ballpark here, statistics.

In the United States now we consume nearly 110 billion gallons of gasoline annually. Assuming a 10-percent alcohol mixture, we would need 11 billion gallons of alcohol if we are going to do that. I

think that's the best or worst case scenario, depending on how you interpret it, as to how much alcohol production there might be.

This is a point that I thought might be raised in light of what you said earlier, Professor Tyner. This year, 22 million acres, agricultural acres, are being idled under Federal supply control programs in the United States. We are paying people not to plant. Now, assuming for the sake of our discussion that this goes beyond soil conservation measures and is just a matter of idling acreage to keep prices high, these acres could be expected to produce about 900 million bushels of grain which could be converted to about 2.3 billion gallons of alcohol.

Now, I think Dr. Schwandt made the point earlier that we have an underutilized capacity to produce grain in this country, and it would seem to me that this flexible area, this area for expansion, would argue against your conclusion that we cannot have an ethanol industry that is a positive force on the energy side without sacrificing the potential for exports. It seems as if, under the present circumstances, there is room for expansion of production for ethanol purposes and still maintain the current production for export.

Professor TYNER. If you interpret what I said as that way, I need to stand corrected, because the range you talk about, the 2.3-billion-gallon range, is exactly the range where we don't do any damage to our exports. It is up in that area where we can take land that we have been paying farmers not to grow and we can use those corn resources to make alcohol, we can do it at very low cost.

What I am saying is, as you start the program and move it on, if you're serious about it and you want to make it a part of farm policy, you have the opportunity to convert a part of farm policy into an alcohol program, to make alcohol policy a part of farm policy. Now, all I'm suggesting on the other side is be careful and not go too far.

Mr. DURBIN. What is too far?

Professor TYNER. The 2-to-3-billion-gallon range, beyond that.

Mr. DURBIN. You say beyond that?

Professor TYNER. Right. The numbers you cite are roughly correct.

Mr. DURBIN. Thank you very much. I appreciate your contribution this morning from this panel, and I thank you for your trip over from Purdue. We extend great hospitality to Boilermakers in July. Come October, it's another story. [Laughter.]

Thank you very much.

Mr. DURBIN. The next panel which we have this morning, which I would like to call in the interest of keeping on schedule, is Mr. John Beatty, who is a board member of the Illinois Farm Bureau from Bloomington, IL, Mr. Dain Friend, vice president of the Illinois Corn Growers Association, and Mr. William Holmberg of the Solar Lobby in Washington, DC.

Mr. HOLMBERG. Mr. Durbin, I have been asked to tell you that Dain Friend has an executive meeting of the Corn Growers and couldn't be here at this time. He will submit formal testimony.

Mr. DURBIN. We know of his contribution in this area and would be more than happy to receive his testimony.

[The prepared statement of Mr. Friend follows:]

TESTIMONY OF DAIN FRIEND BEFORE
COMMITTEE ON SCIENCE & TECHNOLOGY
SUBCOMMITTEE ON INVESTIGATIONS & OVERSIGHT
AND
COMMITTEE ON AGRICULTURE
SUBCOMMITTEE ON WHEAT, SOYBEANS & FEED GRAIN

U. S. HOUSE OF REPRESENTATIVES

DECATUR, ILLINOIS

JULY 6, 1984

Mr. Chairman: My name is Dain Friend and I am vice president, legislative affairs of the National Corn Growers Association representing corn growers in the 16 principle producing states.

Corn growers have long supported the concept of a renewable fuel industry using corn as a raw material. From the early days of the fuel crunch and long gas lines in 1974 when corn growers were promoting the use of "gasohol" with bumper and pump stickers to the present moment when blended fuels account for more than 4% of the U.S. motor fuel market, corn growers have been leading advocates of ethanol blended fuels. We have encouraged the federal government to provide a temporary economic incentive by means of the federal motor fuel tax exemption for ethanol blended fuels and have been active at the state level in some 34 different states to originate and maintain a state exemption to help get the industry off the ground.

As growers, our interest is twofold: the assurance of a domestic fuel supply that is not dependent on foreign imports and the improved utilization of the U.S. corn crop.

When consumers were experiencing long gas lines and the attendant inconvenience, farmers in the United States were concerned about a fuel supply for their tractors and harvesting equipment. An assured domestic fuel source could play an important role in assuring food and fiber supplies. Use of ethanol as an octane enhancer provides such an efficient octane boost that for each barrel of ethanol used up to two additional barrels of high octane gasoline can be produced. In 1983 fuel ethanol blends reduced the U.S. imports of crude oil by roughly 10 million barrels. In 1983 180 million bushels of corn were utilized for ethanol fuels. Utilization in the current year is expected to increase by more than 20%. As we face a world market where foreign government subsidies and restrictions, dollar valuation, high interest cost and foreign production increases restrict our overseas trade opportunities, it is vital to us that the domestic corn market for fuel ethanol be maintained and improved.

Our desire and our need is to produce maximum corn volume at lowest possible cost for greatest efficiency. Fuel ethanol utilizaton of corn is estimated to increase the average price per bushel of corn by 25¢. Therefore the National Corn Growers Association is committed to efforts which will encourage maximum utilization of the corn crop.

We strongly feel that the federal and state system of incentives for ethanol fuel is a much better expenditure of public funds than the corn production curtailment alternatives. Exhisting incentives are designed to serve as a catalyst for market expansion with the state incentive expected to result in construction of indigenous production facilities to service the market previously created. Once the creation of a sufficient market and acceptance of the product is demonstrated, new production is being built. Fuel ethanol production capacity increased 100 million gallons in 1983 to 575 million gallons. New production presently under construction totals 84 million gallons.

A domestic fuel alcohol industry is a perfect example of an industry that applies value added processing to abundant domestic resources in the way that increases economic activity, creates jobs, and increases federal, state and local tax bases.

Corn growers presently have projects under consideration that will investigate the utilization of an important feed by product of the ethanol industry in the more economical wet form. Such investigation as well as promotion of the effectiveness of ethanol as an octane enhancer over against other enhancers will very likely expand the ethanol market. As a corn grower, I can assure you that we are doing everything possible to produce corn as efficiently as modern technology and good management will permit simply because the present lack of profit in corn production offers us no other choice.

If all existing fuel ethanol capacity and capacity under construction were operated at full production, corn utilization for ethanol would total 260 million bushels, an amount equal to 1/7 of 1983/84 corn exports. Growers are urgently seeking to capitalize on this and all other demand enhancement opportunities. Such usage expansion is desperately needed to return profitability to corn production.

Corn growers strongly support HR 5727 as a sensible way of encouraging the ethanol industry and corn utilization while discouraging the continued use of a known deadly substance which is extracting a heavy penalty in human suffering in this country.

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Mr. DURBIN. The first witness who we have is Mr. John Beatty from the Illinois Farm Bureau. Mr. Beatty, any formal written remarks which you have will be made part of the official record, and if you would like to summarize those at this point, we would be more than happy to hear you.

STATEMENTS OF JOHN A. BEATTY, MEMBER, BOARD OF DIRECTORS, ILLINOIS FARM BUREAU AND WILLIAM C. HOLMBERG, PROGRAM MANAGER, SOLAR LOBBY

Mr. BEATTY. Thank you, Mr. Durbin.

Mr. Chairman, members of the committee, I am John Beatty of Rural Route 1, Waverly, IL. My farm operation is a 2,140-acre, grain farm with a herd of purebred polled Hereford cattle. I am a member of the board of directors of the Illinois Farm Bureau, for whom I am appearing today.

With the list of expert witnesses that have testified, plus those scheduled to be heard, I would be out of place to attempt to discuss the technical aspects of alternative fuel developments. Thus, I will confine my remarks to the general policy position of the Farm Bureau organization.

Mr. Chairman, the Illinois Farm Bureau is very interested in and supportive of the development of alternative fuels, including ethanol. We are supportive of the efficient production of such fuels. Our lack of enthusiasm for "on farm" fuel facilities several years ago was misinterpreted by some as a lack of enthusiasm for alternative fuels. Generally, we believe research data has justified that lack of enthusiasm for "on farm" fuel facilities. To our knowledge, such facilities have not been able to attain the efficiency and economy of some of the commercial producers, including the ADM's and A.E. Staleys.

Illinois Farm Bureau's policy support for alternate fuels for the past several years is quite clear as our 470 farmer delegates to our organization's annual meeting have adopted a policy which, in part, states:

> We will support extensive research programs to develop existing sources of energy. New or alternate sources of energy to be explored should include nuclear fusion, solar, wind, coal gasification, shale oil extraction, expanded hydroelectric, geothermal, agricultural crops, animal waste, other waste materials, and recycling. We will support research, development and promotion of competitively priced ethanol for use in gasohol and as a complete fuel. We will encourage the use of various incentives, including grants, loans and tax provisions to stimulate the development of new sources of energy providing they do not reduce motor fuel tax funds. We will support a major investment credit and accelerated depreciation program for natural and synthetic energy facilities.

As we understand the provisions of H.R. 5727, they would appear to be consistent with this policy.

At the 1984 annual meeting of our national organization, the American Farm Bureau Federation, the delegates from across the Nation adopted a policy which states:

> The tax credit for ethanol used in motor fuel is necessary to develop this new energy source. The tax credits in effect in many States should be consolidated into a single tax credit at the Federal level. We support legislation to make the tax credit at the Federal level 9 cents for ethanol used in motor fuel, thus permitting the States to phase out the State tax incentives.

While this policy does not speak to several of the specific provisions of H.R. 5727, it is our belief that H.R. 5727 is consistent with the thrust of the action taken by our national delegates this past January.

Mr. Chairman, it is my observation that Illinois farmers are supportive of the efficient production of competitively priced alternate fuels. They don't want to be dependent on foreign fuels. They understand what fuel dependence can mean if foreign fuel supplies are disrupted, not only to farmers but to our Nation's security. They also understand the impact that high-priced, foreign fuel can have on the U.S. balance of trade. Farmers are interested in seeing an annually renewable resource (grain) used for fuel production. It can be an expanding market for farmers' crops. Farmers appreciate the desirability of providing jobs to our own families instead of exporting our jobs. And I believe farmers appreciate the environmental desirability of moving away from leaded fuels.

While the delegate action at neither the most recent Illinois Farm Bureau nor the American Farm Bureau Federation annual meetings addresses the specific provisions of H.R. 5727, its provisions would appear to be consistent with the goals set forth by our delegates. We believe it merits your committee's serious consideration.

We thank you for this opportunity to appear before you.

[The prepared statement of Mr. Beatty follows:]

Statement by John A. Beatty
--Illinois Farm Bureau--
Joint Hearing - House Agriculture
Committee, Sub-Committee on Wheat,
Soybean and Feed Grains and House
Science & Technology Committee,
Sub-Committee on Investigations and Oversight
Decatur, Illinois
July 6, 1984

Mr. Chairman, members of the committee, I am John A. Beatty of Rural Route #1, Waverly, Illinois. My farm operation is a 2,140 acre grain farm with a herd of purebred polled Hereford cattle. I am a member of the Board of Directors of the Illinois Farm Bureau, for whom I am appearing today.

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Mr. DURBIN. Thank you, Mr. Beatty.

Now from Washington, with the Solar Lobby, Mr. William Holmberg.

Mr. HOLMBERG. Mr. Chairman, if you think you had trouble with farm economists in 1984, you should have seen what it was like back in 1978. The technology has come a long way and so has their thinking, and I suspect it will come a lot further.

I would like to address three primary considerations: environmental concerns, national security issues, and the importance of decentralized community based energy systems.

Last week I attended a methanol symposium in California. Several major corporations were represented, including Celanese, ARCO, Toyota, Bank of America, Detroit Allison Diesel, Ford, and Southern California Edison. The director of Ford's automotive emissions and fuel economy office summarized the essence of the meeting by saying:

> It is unreasonable to expect that free market forces alone will launch any alternative fuel program in the presence of relatively inexpensive and stable oil supplies such as the Free World enjoys today. Simply stated, launching a replacement transportation fuel will not take place without a well-coordinated program of Government incentives and actions.

Later he concluded by stating:

> We do not see any insurmountable technical problems.

I would like to interject here that this basically is true with the ethanol industry. There simply are not any insurmountable technical problems.

> However, it is going to take a great deal of effort on the part of the auto industry, the oil and chemical industries, and the Government, to bring methanol vehicles—and fuels—to the marketplace in quantities that are economically practical.

If these major corporations, with billions in investment capital available to launch new industries, with highly developed R&D programs and with already established market shares in the production, refining, distribution, marketing and combustion of high grade liquid fuels need a "well-coordinated program of Government incentives and action," does ethanol, as a gasoline enhancer and neat fuel, have a chance at all without these same incentives and actions? Thankfully, the Congress has been and continues to be supportive of the ethanol industry. This hearing is further evidence of that interest and support, and we are grateful.

But the stakes are enormous. The combination of high grade liquid fuels and internal combustion engines is the biggest technologically advanced business in the world, with frightening economic, ecological, political, and military consequences.

With the progress being made primarily in Brazil, where over 80 percent of the new cars produced in the past year are running on neat ethanol, and here in the United States, where alcohol blended fuels are approaching 8 percent of the gasoline market, it is becoming increasingly certain that the alcohols, ethanol, and methanol, will become the primary high grade liquid fuels early in the next century. The questions that remain to be answered are whether they will be combusted as alcohols, oxygenated hydrocarbons, or whether they will be combusted as gasolines; that is, the Mobil MTG process, methanol to gasoline, and the Purdue ethanol to gas-

oline processes. The other question is what will be the ethanol/methanol mix of the future?

If free market forces prevail, these questions will be resolved by profit and market share motives, with environmental, national security, international policy, jobs, and community development issues left to Government incentives and regulatory actions being applied in a catch-up fashion.

Because we are now at the beginning of the transition to a new form of high grade fuels, the alcohols, it is imperative that the Government, representing all the people, get out in front on this vital issue. This hearing is certainly a right step in the right direction, but it is only one important step in a 20-year march.

The Solar Lobby and the Center for Renewable Resources are dedicated to the vision of a sustainable, environmentally enhanced, and peaceful world. Support for ethanol to enrich gasoline and as a neat motor fuel qualifies in all three areas.

In terms of sustainability, Jack Reed of ADM has done, I think, a commendable job in that area. In terms of environmental factors, Bob Schwandt addressed the issue of lead in gasoline, alternatives to leaded gasoline, and the fact that ethanol does, in fact, reduce automotive emissions.

We do have a problem there, in that the addition of alcohol to gasoline—and alcohol as a neat fuel—does cause an increase in evaporative emissions, but there are scientific and technical fixes to that if we will just simply get on with those solutions.

I would also like to address improved farming practices. It has been well demonstrated that depressed prices for feed grains force farmers to extend planted areas into marginal land, to curtail topsoil conservation practices, and to cut back on water pollution abatement efforts. The U.S. ethanol program has improved farm prices, and as the industry expands, it will further boost the price for corn and other feedstocks. As improved farm economies lead to environmentally sound farming practices, this factor will also drive up the cost of ethanol. This again highlights the critical role of Congress in recognizing that the ethanol program is far more than an energy program. It is equally important as a farm program, as an environmental program, and a national security program. Free market forces, working in one sector only, cannot turn the various cost benefit factors into a beneficial program to the entire Nation. That is a Government responsibility.

Carbon dioxide buildup in the upper atmosphere is another important environmental issue. There are many causes for the buildup of CO_2 in the upper atmosphere and the consequences of this increase remain unclear. We can, however, be certain that part of the problem stems from the combustion of fossil hydrocarbon fuels. By starting the transition to renewable biofuels, we are also addressing the issue of CO_2 buildup. As long as we prudently follow each harvest with another planting, the ethanol part of the action will be recycling its own CO_2 contribution, and more, if we can build up soil organic matter through waste utilization and positive biological activity.

ACID RAIN

The principal contributors to acid raid are sulfur and nitrogen oxides. There is no measurable sulfur in ethanol, and when used in a neat form, ethanol, in the lower proof ranges, can be efficiently combusted below 1700 degrees Fahrenheit, thereby precluding the formation of nitrogen oxides.

An additional point to be made here is that a recent study indicated that if we can drop the ozone levels to normal background levels, agricultural productivity in the United States will increase by 6 or 7 percent. So, the issue of whether or not we can produce enough corn for the marketplace is a function of many complex factors, including ozone buildup.

ALDEHYDES

Although aldehydes are not controlled by EPA emission standards at this time, they are photochemical oxidants that result from the combustion of the alcohols. R&D programs should be accelerated to ensure that this consideration is resolved before it becomes a problem.

NATIONAL SECURITY

Adm. Thomas H. Moorer, former Chairman of the Joint Chiefs of Staff, has, on several occasions, submitted testimony on the vital role locally produced ethanol plays in the overall security of the United States. A copy of that testimony is submitted for the record.

In summary, it focuses on reduced dependence on imported oil, vulnerability of centralized production, refining, transportation and storage systems, the declining number of facilities servicing rural areas, and the criticality of insuring adequate energy supplies to serve the farming community.

In conclusion, the United States is starting the transition to alternative high-grade, liquid fuels. Ethanol is one of the primary contenders. It has major environmental, employment, community-development and national-security benefits. In the near term, it has a price disadvantage. It is up to the Government, to the Congress, to design strategies, after weighing all the costs and benefits, that will ensure a high-grade, liquid fuel mix for the future that best serves the American people in all involved areas.

One concluding remark, Mr. Chairman, and this goes to the issue of the absolute necessity of strong congressional support for the ethanol program. As I indicated earlier, we are getting into a high stakes game. The alcohols could well be the future high-grade liquid fuels of the United States. How that sorts out will be a function of the U.S. Congress. The technology is there, the willingness on the part of the American farmers is certainly there, public response is certainly there. But it has got to be the Congress that designs the system.

I might suggest that the Congress sometimes is very fickle. Just 3 weeks ago the House Ways and Means Committee traded away the renewable energy tax credits, tax credits vital to the ethanol industry. Large handouts were made to already well-established and heavily subsidized nuclear industry organizations. They re-

ceived the energy play. A $300 million tax dodge, more than enough to cover the cost of the business energy tax credits for 3 years, went to 200 wealthy commodity marketeers. That was a local Illinois play. I submit for the record a Washington Post article covering that maneuver.

The point to be made is that we are, in fact, entering this high stakes game. Powerful enemies will show up in strange places at critical times. We need powerful friends who will stick with us for the long haul, and we are counting on you for that role.

[The prepared statement of Mr. Holmberg, with attachments, follows:]

PREPARED STATEMENT OF WILLIAM C. HOLMBERG, PROGRAM MANAGER, SOLAR LOBBY

Testimony Before The Subcommittee on Investigations and Oversight,
Science and Technology Committee and The Subcommittee on Wheat,
Soybeans and Feed Grains, Agriculture Committee

I am Bill Holmberg, Program Manager for the Solar Lobby. This presentation is being made on behalf of myself and Tina Hobson, Executive Director of the Lobby and the Center for Renewable Resources. Thank you for this opportunity.

We would like to address three primary considerations: Environmental concerns, National Security issues, and the importance of decentralized community based energy systems.

Last week I attended a methanol symposium in California. Several major corporations were represented, including Celanese, ARCO, Toyota, Bank of America, Detroit Allison Diesel, Ford and Southern California Edison. The Director of Ford's Automotive Emissions and Fuel Economy Office summarized the essence of the meeting -- "We believe it will require a well coordinated program involving government incentives to vehicle manufacturers, to customers, and to oil and chemical companies. It is unreasonable to expect that free market forces alone will launch any alternate fuel program in the presence of relatively inexpensive and stable oil supplies such as the free world enjoys today. Retail buyers simply would not be willing to purchase alternative fuel vehicles unless the fuel, or the vehicles, or both, were sold below cost during the launching period. Simply stated -- launching a replacement transportation fuel will not take place without a well-coordinated program of government incentives and actions." Later he concluded by stating, "We do not see any insurmountable technical problems. However, it is going to take a great deal of effort on the part of the auto industry, the oil and chemical industries, and the government to bring methanol vehicles -- and fuels -- to the market place in quantities that are economically practical."

If these corporations, with billions in investment capital available to

launch new industries, with highly developed R&D programs and with already established market shares in the production, refining, distribution, marketing and combustion of high grade liquid fuels need a "well-coordinated program of government incentives and action," does ethanol -- as a gasoline enhancer and neat fuel -- have a chance without these "incentives and actions"? Thankfully, the Congress has been and continues to be supportive of the ethanol industry. This hearing is further evidence of that interest and support. We are grateful.

But the stakes are enormous. The combination of high grade liquid fuels and internal combustion engines is the biggest technologically advanced business in the world with frightening economic, ecological, political and military consequences.

With the progress being made primarily in Brazil (over 80% of cars produced in the past year run on neat ethanol) and here in the United States (alcohol blended fuels are approaching 5% of the unleaded market), it is becoming increasingly certain that the alcohols -- ethanol and methanol -- will become the primary high grade liquid fuels early in the next century. The questions that remain unanswered are whether they will be combusted as alcohols -- oxygenated hydrocarbons -- or converted into gasoline, i.e., the Mobil MTG (methanol to gasoline) and the Purdue ethanol to gasoline processes. The other question is what will be the ethanol/methanol mix of these fuels?

If "free market" forces prevail, these questions will by resolved by profit and market share motives -- with environmental, national security, international policy, jobs and community development issues left to government incentives and regulatory actions being applied in a "catch up" fashion.

Because we are now in the beginning of the transition to a new form of high grade liquid fuels -- the alcohols -- it is imperative that the

government, representing all the people, get out in front on this vital issue. This hearing is certainly a right step in the right direction — but only one important step in a long, twenty-year march.

The Solar Lobby and the Center for Renewable Resources are dedicated to the vision of a sustainable, environmentally enhanced and peaceful world. Support for ethanol to enrich gasoline and as a neat motor fuel qualifies in all three areas.

SUSTAINABLE

Ethanol, through fermentation and hydrolysis can be produced from a wide range of feedstocks ranging from sugar, corn and milo to grasses and trees to garbage and sewer sludge. When food and feed crops are used, the coproducts usually include concentrated and enriched protein for food and feed as well as carbon dioxide. CO_2 can be used in enhancing the growing environment in greenhouses, in beverages and in a wide variety of commercial and industrial processes. When grasses and trees are involved, the coproducts include valuable animal feeds and CO_2. When garbage and sewer sludge are used, the system yields concentrated and transportable fertilizers.

With crops, grasses and trees being replanted as they are used, and with sound soil conservation and fertility practices along with measures to properly use and protect ground and surface waters, billions of gallons of renewable ethanol can be produced while actually increasing food and feed supplies and enhancing the environment.

ENVIRONMENTAL FACTORS

It is well established that lead in the environment causes significant human health problems, found especially among children who are more susceptible to lead poisoning, and particularly among inner city children who breathe the air and play in the dust and dirt containing unacceptably high levels of lead, leading to anemia, learning disabilities and behavioral

changes. The very children who need a "head start" are suffering a "head slowdown." The lead in the air and much of it in the dust and dirt comes from automotive emissions -- about two ounces of lead for every tank of leaded gasoline. The advent of emission control devices, including catalytic converters, spurred the market for unleaded gasoline. The production, distribution and marketing of lead free gasoline is routine and fully acceptable to the public. But the lower cost of high octane leaded gasoline makes it sufficiently attractive to cause upward to 15% of motorists to poison their catalytic converters by burning cheaper leaded gasoline. Public education, increased inspections and enforcement actions are difficult, costly and time-consuming. Addressing the price differential by means of a lead users fee is probably the most direct and effective method of dealing with this problem.

The cost of this users fee would fall heavier on drivers of older cars designed to burn leaded gasoline. Too frequently these are lower income Americans living in central cities — generally the same families that suffer the most from lead in gasoline. It is in their best interest to remove lead from gasoline. Various studies have estimated that the medical and social cost of leaded gasoline could approach a billion dollars annually — far more than the cost of removing lead in gasoline.

Alternatives to Lead in Gasoline

The primary octane boosting alternatives to lead in gasoline are ethanol, methanol, MTBE (methyl tertiary butyl ether), MTBA (methyl tertiary butyl alcohol), toluene, xylene and benzine.

G.H. Uzelman of the Ethyl Corporation, in evaluating these alternatives come to the conclusion that:

o Oxygenates will become increasingly important alternatives in gasoline

to conserve crude oil and improve octane number.

- o The extensive laboratory work of this study both confirmed and extended the scope of previous work in determining octane blending values for ethanol, Oxinol, TBA, and MTBE. As energy extenders and octane improvers, ethanol and MTBE appear to have the greatest potential.

Ethanol Reduces Automotive Emissions

It has been well demonstrated that a mixture of 10% ethanol and 90% gasoline significantly reduces carbon monoxide and unburned hydrocarbons emissions. Oxides of nitrogen are about the same as unleaded gasoline. Evaporative emission (hydrocarbons) increase, but this factor can be alleviated in several ways: addition of ethanol at the refinery and the use of reforming practices that control evaporative emissions from the finished product; use of in-vehicle vapor recirculating and filtering systems; and a combustionable chemical additive to control evaporative emissions. All three are technically and economically feasible and, when used in concert, would not only reduce evaporative emissions below current levels for unleaded gasoline, but would also obviate the need for expensive, cumbersome and hard to inspect and maintain control devices that are becoming part of the in-station fueling process in air quality sensitive areas.

Improved Farming Practices

It has been well demonstrated that depressed prices for feed grains forces farmers to extend planted acres into marginal land, to curtail top soil conservation practices and to cut back on water pollution abatement efforts. The U.S. ethanol program has improved farm prices and, as the industry expands it will further boost the price for corn and other feedstocks. As improved farm economies lead to environmentally sound farming practices, this factor will also drive up the cost of ethanol. This again highlights the critical

role of the Congress in recognizing that the ethanol program is far more than an energy program. It is equally important as a farm program, an environmental program and a national security program. Free market forces, working in one sector only, cannot turn the various cost/benefit factors into a program beneficial to the nation. That is a government responsibility.

Carbon Dioxide Buildup in the Upper Atmosphere

There are many causes for the buildup of CO_2 in the upper atmosphere and the consequences of this increase remain unclear. We can, however, be certain that part of the problem stems from the combustion of fossil hydrocarbon fuels. By starting the transition to renewable biofuels we are also addressing the issue of CO_2 buildup. As long as we prudently follow each harvest with another planting, the ethanol part of the action will be recycling its CO_2 contribution -- and more if we can build up soil organic matter through waste utilization and positive biological activity.

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CONCLUSION

The United States is starting the transition to alternative high grade liquid fuels. Ethanol is one of the primary contenders. It has major environmental, employment, community development and national security benefits. In the near term it has a price disadvantage. It is up to the government -- the Congress -- to design strategies, after weighing all the costs and benefits, that will ensure a high grade liquid fuel mix for the future that best serves the American people in all involved areas.

Mr. DURBIN. Thank you very much. That's a good statement.

I'm glad you brought up several points, Mr. Holmberg. It is a high stakes game. We know it where we live right here in the Midwest on the issue of natural gas. And when I try to find a coalition of people who share my concerns about our skyrocketing natural gas prices, my friends from the South and the West can't quite measure the same kind of intensity for this issue in their home areas as we do. In fact, they would just as soon keep the prices high.

The nuclear industry in Washington, I think, keeping in mind that it supplies 50 percent of the electrical power in this State—let us not be totally ungrateful—certainly has its friends and is well supported in those efforts. What we are trying to do, particularly in ethanol, is to develop a constituency that sees it as a means of integrating and building a coalition of people who can agree that we should move toward the ethanol industry.

When I first announced the legislation that I have introduced—and I do not fault the local media for this—but someone went to a local gas station in this town and went up to a poor, unsuspecting person at the pump and said, "Well, Congressman Durbin just said he wants to raise the tax 2 cents on leaded gasoline. I see you're pumping it. What do you think of that?" Well, you can imagine what the reaction was. Is this guy crazy? It's an election year. Why does he want to raise the price of leaded gasoline?

The point that is not being made—and I think you have alluded to it in your statement, Mr. Holmberg—is that many people really are not saving money using leaded gasoline. Forget the public health concern. Just from the viewpoint of what it costs to operate

a car, if you are misfueling an automobile and putting leaded gasoline in that tank thinking that you're saving 6 to 10 cents a gallon, what is escaping your attention are two things: First, you have just increased your auto emissions by 800 percent. The ozone alerts that we have, the carbon monoxide in our atmosphere, are no accident, not God created. They are created by misfueling and a lot of other things which we can avoid.

Second, there is usually no savings to you in using it in an automobile, because what you have done is basically fouled an engine that was designed to operate efficiently with unleaded gasoline. So people are not saving money many times when they misfuel.

That is going to take a major educational effort, for us to convince people that this is not only good for our economy and for jobs and for the farmers, but it's an environmental concern that we all share. I think your statement was excellent in that regard. I commend you for it. I think you hit the nail right on the head when it came to that.

Mr. Beatty, let me add to this, though, that we know there is one lingering problem—not many, but at least one lingering problem in the phase out of lead. On the agricultural scene there are many pieces of equipment that use leaded gasoline. They are designed to do that. The thought that many of our farmers would have to turn and buy new equipment, of course, would be something that would frighten anybody when you consider the prices and interest rates that face them. We are trying to devise some means of an interim move to provide the necessary fuel for key aspects of our economy that still need lead in the gasoline as an octane additive for at least some phase out period of time. We are sensitive to that and I appreciate your comments about the bill and I hope you will take that message back to the spokesmen at the Farm Bureau.

At this point let me add, too, that the Illinois Farmers Union, through its president, Harold Dodd, has submitted a statement, which will be made part of the record.

[The prepared statement of Harold Dodd follows:]

Prepared Statement of Harold Dodd, President, Illinois Farmers Union

My name is Harold Dodd. I am actively engaged in farming, and live at Loami, Illinois, and for many years have been President of Illinois Farmers Union.

I want to thank the Committee Members and particularly my friend, Congressman Durbin for holding these hearings here in Illinois, where they will not be interrupted by vote calls, and where you all can see for yourselves how ag ethanol has helped the local economy and provided a continuous market for our corn.

Ever since Illinois commercialized the use and sale of fuel with ag ethanol, the Illinois Farmers Union has fully supported this industry.

In the fall of 1977, I flew with Sec. John Block, then Director of Illinois Agriculture, to Zion, Illinois, where we were joined by Representative Adeline Geo-Karis, Gib Frickie, Supt. of Markets, Illinois Department of Agriculture, Al Mavis and the press. There we poured the first 4 barrels of cheese whey ethanol into the storage tanks of a gasoline station, producing Illinois' first commercial sale of gasohol.

Fuels containing ethanol were conceived by Nebraska, but commercialized by Illinois.

Our Annual Meetings each year approve a resolution giving full support to the development and use of ag ethanol as a viable growing market for agricultural production. Our speakers' platform has always included people from the industry, who have kept us abreast of this developing industry.

There is no question that, if this industry had continued to receive the full support of the Administration and the leadership of USDA and DOE, as experienced under the Carter Administration, the American farmer would be facing a brighter market outlook for his production than what is now apparent.

Deregulation of the airline and trucking industry has almost destroyed them, and agriculture without a strong USDA leadership and market development programs will be destroyed also.

Farmers Union has always had as its goal a profitable agriculture. Without this we have a totally depressed America, as is now the case.

Profitability in agriculture can only be achieved when the price received by the producer is above cost of production. What creates price is demand. What creates demand is product use.

The USDA has attempted to create this demand by "funny money" programs to finance the sales and pay the interest on loans for countries that only buy from us as a last resort. This money spent for ag ethanol would give us the constant market we must have.

An ag ethanol program that would supply 10% ethanol to the fuel industry; so as to assure the health of our children, give the car owner a fuel that is higher in octane so his car performs better, is feasible and could be attained at an early date, if given leadership and financing.

Ag production converted to ethanol will have a market each and every day. It is like food, what is consumed one day must be replaced by another gallon tomorrow.

The corn prices in and around the ethanol plants at Decatur, Peoria and Pekin are at a premium due to the daily demand for ethanol.

America is a world of wheels. The wheels are powered by liquid fuel, which a part can and should be ag ethanol.

I will not talk about the jobs this domestic industry will create, the increased farm income, the taxes it will develop, the cleaner environment or its importance to National security. This is all well known and documented in the General Accounting Office report just released, and I am certain you have studied.

The Scientific and Technological Committee Members should be

aware of and directing their efforts to programs that will solve the environmental problems of the food industry by converting them to useable and saleable products. For instance:

Our dairy industry has been plagued with the problem of cheese whey disposal. Why has there not been specific projects ordered and funded to solve this? Is it because we want to be good to the rest of the world and let them ship in the cheese, while our plants close because we have not solved this problem? Even today, as we now clarify cheese whey and remove additional protein, we do not have a yeast that will work at the concentrated salt levels this process produces.

80,000 bug samples at USDA Northern Lab, but no one has ordered them to find the bugs needed for this project, nor have funds and equipment been made available for such a project. We, at Illinois Farmers Union ask why not?

It was industry leadership and financing that has confirmed the value and importance of the spent grains when fed wet to dairy and beef cattle. Why wasn't this lead by the USDA and our taxpayer-funded universities and colleges?

There continues the Synfuels Corporation, with billions to spend, and invest in energy projects, that if and when funded will be environmentally questionable, and could be destructive to the water suppliers in the areas where proposed.

All this money, all the need for energy, but this program does not include renewable ag ethanol. Why, I ask?

Surely the Members of this Sub-Committee on Science and Technology are aware of the problems of methanol and of the administration's internal moves to get it used as fuel for government vehicles. What has kept this Committee and its staff from asking that such a program be implemented to use ag ethanol in our government vehicles?

Programs that promote the growth and use of crops that are

strictly energy crops should be carefully studied. Keep in mind each time a bushel of grain is processed into fuel ethanol, we have an equal amount of protein and oil produced. This is a product that, when sold or given to the developing nations of the world, can be used with the locally grown starch crops, and given them an opportunity to have a balanced diet for people and livestock. It will create a market for their local production.

The use of CO_2, as suggested by Archer Daniels Midland, as grain preservative, will preclude diethylbromide scares, such as we just had. Another market for ag production, that does not have environmental problems.

One single recommendation that I feel would be of great help to the industry, as well as to our government and its leaders, would be to put a qualified ag ethanol person on the House and Senate Agriculture and Service Committees.

As President of the Illinois Farmers Union, I strongly recommend these Committees question the USDA's current position on use of ag production as a feedstock for ethanol, and as to their limited leadership in funding and solving issues with respect to the production and use of ag ethanol and its co-products.

It is my personal belief that a goal of one billion bushels of corn for ethanol a year is realistic, and I recommend this Committee goes on record in favor of whatever must be done to accomplish it now.

high fructose corn syrup.

ADM Files for Approval of It's Carbon Dioxide as a Fumigant

ADM recently filed an application with the U.S. Environmental Protection Agency, the approval of which will allow the company to market its carbon dioxide (CO_2) as a fumigant. With increased concern about the use of ethelyne dibromide (EDB) and other chemical pesticides, CO_2 is emerging as a safe, economical and residual-free fumigant.

The Company is monitoring work currently being done by Dr. Edward Jay of the United States Department of Agriculture on the economics and application techniques of CO_2 use for fumigation. CO_2 is approved by the EPA as a fumigant and by the FDA for use in the food industry.

One industry source estimates a ten-fold increase in the fumigation market for CO_2 in the near future. CO_2 is a by-product of ADM's alcohol operations and while the Company is currently processing and marketing a portion of the CO_2 from only one of its alcohol plants, it has the capability of collecting and marketing CO_2 from four locations where ADM has alcohol production facilities.

Illinois Agri-News-Friday, June 22, 1984—Page 21

Ethanol industry benefits producers, helps create jobs

ROCKFORD — U.S. Sen. Charles H. Percy, R-Ill., has released the preliminary findings of a General Accounting Office (GAO) study on U.S. production of ethanol which predicts that the industry could boost annual farm income by $3.6 billion and generate 49,000 new farm jobs by the year 1990.

"Illinois produces half of the fuel ethanol made in the U.S.," said Percy. "This 20-month study demonstrates the significant economic benefits of corn-based fuel ethanol to Illinois and to the nation," said Percy, who was in Rockford for a groundbreaking ceremony at the new three million-gallon fuel ethanol plant operated by the Greater Rockford Energy and Technology Corporation.

"Fuel ethanol is the fuel of the future," Percy said. "It can provide a valuable market to America's corn growers." The Rockford plant will eventually use 10 percent of all the normal yield of Number 2 yellow corn produced in Winnebago County.

As the prime sponsor of legislation which made fuel ethanol blends (formerly called gasohol) eligible for an exemption from the federal highway excise tax, Percy said the GAO study would help respond to the critics of the program who wanted to abolish the exemption. Currently, fuel ethanol blend sellers are eligible for a 5 cent exemption from the 9 cent per gallon federal highway excise tax. Under legislation co-sponsored by Percy and recently passed in the Senate, the exemption would be raised to 6.75 cents per gallon. That measure is currently pending in a House-Senate conference.

The major findings of the GAO study are as follows:

—The current exemption deserves to be maintained at least through its expiration date of December 1992. It has served to stimulate the development of this infant industry and is critical to its continued growth;

—The GAO estimated that corn prices increased 4 cents per bushel and overall farm prices increased by $393 million in 1983 as a result of this industry.

—With a fuel ethanol industry projected to reach one billion gallons by 1990, corn prices could increase by 15 cents per bushel and farm income could increase by $3.59 billion (Actual 1983 domestic production was estimated at 375 million gallons);

—It is estimated that 19,584 new jobs have been created by the fuel ethanol industry since its re-birth in 1977. GAO projected that by 1990, the industry could employ a total of 49,000 people.

Mr. DURBIN. Gentlemen, thank you for joining us today. I appreciate your coming in here and giving us the benefit of your testimony.

Our final panel, which will be coming up, will consist of Mr. Dan Beckman, Deputy Director of the Office of Alcohol Fuels, Department of Energy, in Washington, DC, who is accompanied by Sigmund Gronich—I hope I haven't mispronounced that—and also Mr. Robert Donahue of the Illinois Department of Transportation, State of Illinois, Springfield. Please come up and join us here.

I might add that at the close of the official testimony we will have an open microphone for a few minutes. There are a number of people in the audience who would like to make a statement and we would like to invite them to do so. Those statements will have to be kept somewhat brief, but if a person has written remarks that they would like to make a part of the record, we would be more than happy to entertain those.

Dan Beckman, welcome. We will be glad to hear your testimony.

STATEMENTS OF DANIEL E. BECKMAN, DEPUTY DIRECTOR, OFFICE OF ALCOHOL FUELS, U.S. DEPARTMENT OF ENERGY, AND ROBERT L. DONAHUE, DIRECTOR OF AERONAUTICS, ILLINOIS DEPARTMENT OF TRANSPORTATION

Mr. BECKMAN. Mr. Chairman, I appreciate the opportunity to appear before you today to discuss the current status of the Alcohol Fuels Program. The Alcohol Fuels Program is consistent with and supports the Fourth National Energy Policy Plan, published in October 1983. The overall goal of our national energy policy is to foster an adequate supply of energy at reasonable costs. This policy recognizes that "adequate supply" requires flexibility in fuel supply options, with no undue reliance on any single source of supply. Such flexibility strengthens our national goals to reduce inflation and increase security. The development of alcohol fuel options is consistent with a balanced and mixed energy resource system.

Ethanol has achieved market acceptance as an octane enhancer in a very short period of time, primarily as a result of existing Federal and State tax exemptions. It has grown from 60 million gallons to 410 million gallons in 3 years. This growth was easily accommodated by the existing gasoline industry infrastructure and has been smoothly introduced into the marketplace. The volume of ethanol has remained stable at this level for the past year, even though corn prices have escalated significantly and oil prices have declined slightly.

At the present time, ethanol with Federal and State subsidies competes as an octane enhancer with high grade petroleum products such as benzene, toluene, and the like. Methanol, which currently does not receive any subsidies, is being more widely used as a gasoline blending agent.

Looking to the future, the Department's middle range forecast for world oil prices projects $45 a barrel in 1993. Therefore, when the current tax subsidies are due to be removed, gasoline may cost over $1.40 a gallon rather than today's little more than a dollar a gallon. Thus, under the current forecast, it would appear that alco-

hols could be economically competitive once the current tax exemptions expire.

Regarding specific research and development activities, progress is being made in the development of acid and enzymatic hydrolysis systems. This technology will permit expanding the feedstock resource to include farm residues and trees. Farm residues could represent a large supplemental income source for the agricultural community. A DOE supported project at the Tennessee Valley Authority, an 80,000-gallon-per-year acid hydrolysis facility, will use farm residues to produce its first alcohol next month. Purdue University developed the technology which uses corn stover as a feedstock.

The Solar Energy Research Institute has initiated testing on another acid hydrolysis process as well as enzymatic processes. Several industrial firms are currently performing economic evaluations of these concepts. Preliminary results indicate ethanol selling costs of $1.25 per gallon to $1.60 per gallon in the future may be possible. These estimates are extremely rough, however. This is because they project the economics of the conversion process that is currently undergoing R&D on a very small scale.

Lastly, the University of Illinois is conducting a study on the methods, costs, and impact of collecting corn cobs and stover. Research shows that farmers must receive more than $20 per ton to cover collection costs and must receive enough more to compensate for fertilizer and carbon drain from the residue removed. The program should produce test results and economic assessments within the next 6 months which will indicate the economic viability of alcohol production for systems which can be operational when the current tax exemptions are due to be terminated.

Methanol is another alcohol which can be used as an octane enhancer for gasoline or as a neat or nearly straight fuel. In the current market there is a glut of methanol produced from natural gas and it would not be an attractive option to produce methanol from biomass except for special applications in the near term.

I also want to mention that the Department is conducting R&D on a gasifier to convert wood and farm residues to produce a synthesis gas that can be converted to methanol. The Department is also evaluating catalysts which can produce higher alcohols along with methanol. Such an alcohol mixture can be mixed directly with gasoline without a cosolvent.

The Environmental Protection Agency is studying options to address the problem of lead in gasoline. If leaded gasoline is phased out by 1993, industry will have to choose between refinery modifications or other additives, including alcohol. If all lead were replaced by ethanol, industry analysts estimate that 35 to 70 billion gallons of ethanol equivalent octane enhancers would be needed between 1986 and 1992. Depending on refinery capabilities and market forces, ethanol and methanol could capture a significant portion of the octane enhancer market. According to a combined U.S. Department of Agriculture and Department of Energy report, an ethanol industry of 1.5 billion gallons per year could be supported without major impacts on corn prices. At this level, ethanol could capture approximately 15 percent of the octane enhancer market.

In summary, we are optimistic that, through research and development, alcohols will find more long-term utilization as octane enhancers and neat fuels without the requirement of tax subsidies. In the near term, due to potential softening of oil prices, tax exemptions will still be required.

Mr. Chairman, this concludes my prepared statement. I thank you for the opportunity to appear here today.

[The prepared statement of Mr. Beckman follows:]

PREPARED STATEMENT OF DANIEL E. BECKMAN, DEPUTY DIRECTOR, OFFICE OF ALCOHOL FUELS, U.S. DEPARTMENT OF ENERGY

Mr. Chairman and Members of the Subcommittee:

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Ethanol has achieved market acceptance as an octane enhancer in a very short period of time primarily as a result of existing Federal (5c/gallon for gasohol; an effective subsidy of $.50 per gallon of ethanol) and State tax exemptions. It has grown from 60 million gallons to 410 million in 3 years. This growth was easily accommodated by the existing gasoline industry infrastructure and has been smoothly introduced into the market place. The volume of ethanol has remained stable at this level for the past year even though corn prices have escalated significantly and oil prices have declined slightly.

At the present time, ethanol with Federal and State subsidies competes as an octane enhancer with high grade petroleum products, such as benzene, toluene, and the like. Methanol which currently does not receive any subsidies, is being more widely used as a gasoline blending agent.

Looking to the future, the Department's middle range forecast for world oil prices projects $45 a barrel (1983 dollars) in 1993. Therefore, when the current tax subsidies are due to be removed, gasoline may cost over $1.40/gallon rather than today's little more than $1.00/gallon. Thus, under the current forecast, it would appear that alcohols could be economically competitive once the current tax exemptions expire.

Regarding specific research and development activities, progress is being made in the development of acid and enzymatic hydrolysis systems. This technology will permit expanding the feedstock resource to include farm residues and trees. Farm residues could represent a large supplemental income source for the agricultural community. A DOE supported project at TVA, an 80,000 gallon per year acid hydrolysis facility, will use farm residues to produce its first alcohol next month. Purdue University developed the technology which uses corn stover as a feedstock.

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to a combined United States Department of Agriculture and Department of Energy report, an ethanol industry of 1.5 bilion gallons per year could be supported without major impacts on corn prices. At this level, ethanol could capture approximately 15 percent of the octane enhancer market.

In summary, we are optimistic that, through research and development alcohols will find more long term utilization as octane enhancers and neat fuels without the requirement of tax subsidies. In the near term, due to potential softening of oil prices, tax exemptions will still be required.

Mr. Chairman, this concludes my prepared statement. I thank you for the opportunity to appear here today.

U.S. Department of Energy
Assistant Secretary for
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BIOGRAPHY

Daniel E. Beckman
Acting Director
Office of Alcohol Fuels
Department of Energy

Daniel E. Beckman has served as Deputy Director of the Office of Alcohol Fuels, Department of Energy (DOE), since October 1981. Since the departure of Mr. James Stearns in July 1982, Mr. Beckman has been Acting Director of the Office.

In June 1980, Mr. Beckman was detailed to DOE from the Small Business Administration (SBA) to assist in setting up the Alcohol Fuel Loan Guarantee Program mandated by the Energy Security Act. In January 1981 he was selected to serve as Director of the Financial Incentives Division of the Office of Alcohol Fuels with responsibility for managing the Energy Security Loan Guarantee Program to facilitate construction of alcohol fuel plants.

From 1968 to 1980, Mr. Beckman was employed by SBA serving in staff positions in the Offices of the Associate Administrator for Finance and Investments and the Associate Administrator for Procurement and Management Assistance. In addition, Mr. Beckman had line management responsibility as the Branch Manager of the SBA office in Milwaukee, Wisconsin, and as the Assistant District Director for Finance and Investment in the SBA office in Indianapolis, Indiana.

Mr. Beckman is a Bachelor of Arts graduate of Indiana State University and a graduate of the National Commercial Lending School. He has completed numerous supervisory and management courses conducted by and for the Federal Government. He is a graduate of the Management Intern and Executive Development Programs of the SBA.

Mr. Beckman has received outstanding performance ratings for the past two years, and received a Special Achievement Award in 1974. In 1976 he was named the Outstanding First Year Lion of the Martinsville, Indiana, Lion's Club, and also in 1976 he received a Certificate of Appreciation from the Indianapolis, Indiana, Urban League.

Mr. Beckman is single and the father of a 15 year old son named Philip. He enjoys golf, camping, and reading. A native of Jasper, Indiana, and a former All Conference Football Player, he also enjoys the spectator sports of basketball, football, and baseball. A former Eagle Scout himself, Mr. Beckman has continued his interest in, and support of, the Boy Scouts of America.

Mr. DURBIN. Thank you, Mr. Beckman.

Mr. Robert Donahue from the Illinois Department of Transportation. Thank you for coming.

Mr. DONAHUE. Thank you, Mr. Chairman.

I am Robert L. Donahue, director of aeronautics for the Illinois Department of Transportation. I would like to thank you and the committee for asking us to be here today to testify about our aviation alcohol fuel project. We are very enthusiastic about this project and appreciate the opportunity to share our experience with you.

I would just like to say that what we have been listening to this morning, of course, is enhancements in production, and I think we all, of course, will accept that an expansion of the technology to produce has to be offset with an expansion of the market for that production, and the projects I would like to talk about this morning we hope will contribute to the expansion of that market.

The State of Illinois is vitally interested in the development of ethanol as one alternate to fossil fuels. The State is interested in ethanol for three reasons: first, as a leading agricultural State, Illinois is always seeking new and expanded markets for our agricultural commodities. Success in this effort directly improves the economy of Illinois.

The second reason for Illinois' interest in ethanol is the need for a reliable source of fuel. The last decade has demonstrated conclusively that the United States should reduce its reliance on foreign energy sources. Fundamentally, ethanol is a reliable source of fuel in the sense that it is renewable. Every barrel of oil we remove from the ground leaves us with smaller reserves for the future, and whatever agricultural commodity, byproduct or waste is used to produce alcohol, it will be reproduced with another crop next year.

The third reason for our intense interest in alcohol is environmental improvement. Burning ethanol produces far fewer hydrocarbon emissions than gasoline. By using ethanol, we can improve air quality at low cost and without reducing personal mobility.

For these three reasons, the State of Illinois has an aggressive program to promote ethanol fuel. I would like briefly to mention five aspects of this program.

First, State vehicles are using enhanced gasoline. Since 1980, all 9,500 State-owned vehicles have used a blend of 90 percent gasoline and 10 percent Illinois-produced ethanol.

Some vehicles have been converted to 100 percent ethanol. Since 1977, the Department of Transportation and Department of Central Management Services have experimented with ethanol in passenger vehicles, vans, and trucks. Eleven vehicles have now logged in excess of 250,000 miles in routine use with excellent performance.

The State recently opened an ethanol distillation plant in Vienna, IL. When this plant is operated at full capacity, the Illinois Department of Corrections expects to produce approximately 500,000 gallons of ethanol fuel annually for use in State-owned vehicles.

State grants support ethanol research and development. The State's alternate energy bond program has provided over $550,000 to five projects for research and development in ethanol production and consumption technology.

A State-owned aircraft is successfully flying on ethanol—that's the one you saw this morning, Congressman. For the last 1½ years the Illinois Department of Transportation has operated a Cessna 182 with a Continental 0-470 U engine on 190 proof enthanol.

This fifth element of our program is the focus of my testimony today.

The conversion of the Continental engine from gasoline to 190 proof ethanol was remarkably simple and inexpensive. We selected 190 ethanol rather than 200 proof for demonstration purposes since the equipment necessary for its production is less expensive and more widely available. Four simple modifications were necessary.

First, the weight of the float in the carburetor was adjusted to compensate for the difference between the specific gravity of ethanol and that of gasoline.

The diameter of the fuel jets in the carburetor was increased by 30 percent.

The magneto timing was advanced 8 degrees.

Based on flight experience, we installed a preheater to bring the alcohol to 155 ° to 167 °F before it enters the carburetor.

We have now logged in excess of 66 flight hours on our alcohol fueled aircraft. Our experience in a number of key areas is as follows:

Fuel efficiency. In a controlled, side-by-side test at altitudes below 5,000 feet, a gasoline powered 182 consumed 12½ gallons per hour, compared with 14½ gallons per hour in the ethanol fueled aircraft. We feel that at higher altitudes the consumption will be more comparable. You must also remember that that airplane engine that is now 100 percent ethanol is a converted gasoline engine and, therefore, does not take advantage of the full characteristics of ethanol.

We have achieved a small improvement in performance on ethanol. Approximately 5 percent more power is available at takeoff power.

Economically, the division has been purchasing 200 proof ethanol for approximately $1.80 per gallon and diluting it with 5 percent distilled water to obtain 190 proof ethanol. The effective cost is therefore $1.71 per gallon, which compares favorably to $1.90 to $2.10 for aviation gasoline. The lower cost of ethanol compensates for the reduced mileage and increased consumption.

On the engine wear, it is still too early to fully determine the effect of ethanol use on the engine. However, all signs are positive. We have noted a substantial reduction in carbon deposits in the oil, which of course should lead to reduced friction and wear. In addition, the operating temperature of the engine has been reduced approximately 125 °F, which should result in less engine fatigue.

The quality control, to control the quality of ethanol is much easier than for gasoline. The only necessary tests are to check the alcohol content using a hydrometer and to check the alkalinity using litmus paper. We then filter the fuel through a 10 micron filter to remove any impurities. This process has ensured quality fuel without the complex testing necessary for aviation gas.

On safety, we have had no fuel-related safety problems with the ethanol powered aircraft thus far. In fact, one major safety concern with gasoline is nullified by the use of ethanol. Unlike gasoline,

ethanol mixes with water and, therefore, small amounts of water in the fuel will not cause engine failure.

All in all, the experience of the Illinois Department of Transportation with ethanol as a fuel for aviation has been excellent. The viability of ethanol as an alternative to aviation gasoline in piston engines has therefore been demonstrated. Much more work needs to be done, and while our resources are limited, we wish to be active participants in the process.

I believe that the potential long-range benefits of these projects are substantial and will benefit the entire Nation, not just Illinois. We are in the process of developing a package of more extensive modifications to the enthanol powered aircraft. We hope to substantially increase fuel efficiency by adapting the engine to the particular characteristics of ethanol fuel.

In addition, we have developed a research design for evaluating the potential for ethanol fuel for turbine engines. This is, of course, a much larger potential market for ethanol in turbine engine powered aircraft.

I might just say that at O'Hare Field alone, almost 1 billion gallons of jet fuel is pumped annually. Ten percent of that is obviously 100 million gallons of ethanol. Ethanol is not an additive at the present time in jet fuel.

The department has expended substantial time and effort on ethanol from within its operating budget. However, constraints on State expenditures continue to be severe and preclude major new initiatives in the area of research of the sort we are proposing. Thus, further State efforts depend on obtaining funds from Federal or private sector sources. It would be appropriate if the Federal Government took the lead role in funding this type of research. It is my hope that Federal agencies will provide grants for continued research on such practical applications of ethanol fuel as our proposed projects.

In closing, I would just like to say that our ethanol powered aircraft is available for your inspection by members of the private or public sector. We normally keep it at Capitol Airport in Springfield, at our facility on the airport. We did fly the airplane over this morning, and I'm sure it took the Congressman's eye because of its distinctive paint job. It is out on the Decatur Aviation ramp and we have two pilots standing by to answer any of your questions you may have regarding its flight characteristics. Personally, I have flown it about 12 hours myself and it flies just like any other Cessna 182.

Thank you very kindly.

[The prepared statement of Mr. Donahue follows:]

PREPARED STATEMENT OF ROBERT L. DONAHUE, DIRECTOR OF AERONAUTICS, ILLINOIS DEPARTMENT OF TRANSPORTATION

Mr. Chairman, I am Robert L. Donahue, Director of Aeronautics for the Illinois Department of Transportation. I would like to thank you and the Committee for asking us to be here today to testify about our aviation alcohol fuel project. We are very enthusiastic about this project and appreciate the opportunity to share our experience with you.

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The second reason for Illinois' interest in ethanol is the need for a reliable source of fuel. The last decade has demonstrated conclusively that the United States should reduce its reliance on foreign energy sources. Foreign oil is subject to supply disruptions and price shocks which can have a negative effect on our economy. In contrast, the American farmer has a proven record of reliability in meeting the needs of our nation and the world. Ethanol is a reliable source of fuel in a much more fundamental sense as well. It is renewable. Every barrel of oil we remove from the ground leaves us with smaller reserves for the future. However, whatever agricultural commodity, by-product or waste is being used to produce ethanol, there will be another crop next year.

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1. State vehicles use ethanol-enhanced gasoline. Since 1980, all 9500 state-owned vehicles have used a blend of 90 percent gasoline and 10 percent Illinois-produced ethanol.

2. Some vehicles have been converted to 100 percent ethanol. Since 1977, the Department of Transportation and Department of Central Management Services have experimented with ethanol in passenger vehicles, vans and trucks. Eleven vehicles have now logged 250,500 miles in routine use with excellent performance.

3. The state recently opened an ethanol distillation plant in Vienna, Illinois. When this plant is operated at full capacity the Illinois Department of Corrections expects to produce approximately 500,000 gallons of ethanol fuel annually for use in state-owned vehicles.

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1. The weight of the float in the carburetor was adjusted to compensate for the difference between the specific gravity of ethanol and that of gasoline.

2. The diameter of the fuel jets in the carburetor was increased by 30 percent.

3. The magneto timing was advanced by 8^{o} to fire the spark plug earlier in each cycle.

4. Based on flight experience we installed a preheater to bring the alcohol to 155-167^{0} F before it enters the carburetor.

We have successfully logged 66 flight hours in our alcohol fueled aircraft. Our experience in a number of key areas is as follows:

- Fuel efficiency. In a controlled, side-by-side test at altitudes below 5,000 feet, a gasoline powered Cessna 182 consumed 12.5 gallons/hour compared to 14.5 gallons/hour using ethanol. We believe that at higher altitudes the difference will diminish and that an engine designed for the burning characteristics of alcohol will be substantially more efficient.

- Performance. We have achieved a small improvement in performance on ethanol. Approximately 5 percent more power is available at take-off power.

- Economy. The Division has been purchasing 200 proof ethanol for approximately $1.80 per gallon and diluting it with 5 percent distilled water to obtain 190 proof ethanol. The effective cost is therefore $1.71 per gallon which compares favorably to $1.90 - $2.10 for avgas. The lower cost of ethanol compensates for reduced mileage.

- Engine wear. It is still too early to fully determine the effect of ethanol use on the engine; however, all signs are positive. We have noted a substantial reduction in carbon deposits in the oil, which should lead to reduced friction and wear. In addition, the operating temperature of the engine has been reduced 125^{0} which should result in less engine fatigue.

- Quality control. Controlling the quality of ethanol is much easier than for gasoline. The only necessary tests are to check the alcohol content using a hydrometer and to check the alkalinity using litmus paper. We then filter the fuel through a 10 micron filter to remove any impurities. This process has ensured quality fuel without the complex testing necessary for aviation gas.

- Safety. We have had no fuel-related safety problems with the ethanol powered aircraft thus far. In fact, one major safety concern with gasoline is nullified by use of ethanol. Unlike gasoline, ethanol mixes with water and, therefore, small amounts of water in the fuel will not cause engine failure.

All in all, the experience of the Illinois Department of Transportation with ethanol as a fuel for aviation has been excellent. The viability of ethanol as an alternative to aviation gasoline in piston engines has been demonstrated. Much more work needs to be done, and while our resources are limited, we wish to be active participants in the process.

As we continue our program, we plan to obtain a Supplemental Type Certificate (STC) from the FAA for ethanol, both for the Continental engine and the Cessna airframe. By obtaining an STC, we will remove the use of ethanol from an experimental status which will allow other aircraft operators to convert to ethanol.

As a second phase, we hope to be able to demonstrate the viability of ethanol as an alternative to jet fuel in turboprop aircraft. Doing so would dramatically increase the market for ethanol and encourage its availability on a retail commercial basis.

Given the potential for ethanol as a renewable, domestically produced, non-polluting and efficient fuel, the federal government should take a more active role in demonstrating its practicality and promoting its use. An expanded federal effort with respect to ethanol promotion can be expected to have an immediate, substantial and long-range impact on resolving our nation's energy and economic problems.

I believe that the potential long-range benefits of these projects are substantial and will benefit the entire nation, not just Illinois. We are in the process of developing a package of more extensive modifications to the ethanol-powered aircraft. We hope to substantially

increase fuel efficiency by adapting the engine to the particular characteristics of ethanol fuel. In addition, we have developed a research design for evaluating the potential for ethanol fuel for turbine engines. This is, of course, a much larger potential market for ethanol in turbine engine powered aircraft. The Department has expended substantial time and effort on ethanol from within its operating budget. However, constraints on state expenditures continue to be severe and preclude major new initiatives in the area of research of the sort we are proposing. Thus, further state efforts depend on obtaining funds from federal or private sector sources. It would be appropriate if the federal government took the lead role in funding this type of research. It is my hope that federal agencies will provide grants for continued research on such practical applications of ethanol fuel as our proposed projects.

In closing, I would just like to say that our ethanol-powered aircraft is available for your inspection by members of the private or public sector. I will be glad to answer any questions about the aircraft or the ethanol project in general. The aircraft is located in Springfield at Capital Airport at the Division of Aeronautics hangar. Thank you again for the invitation to testify today about the success we in Illinois have had with our ethanol-fueled aircraft.

Mr. DURBIN. Thank you, Director Donahue.

Congressman Simon.

Mr. SIMON. Yes; you call for additional research, and, Mr. Beckman, you say that we are optimistic through research and development alcohols will find more long-term utilization as octane enhancers and neat fuels without the requirement of tax subsidies. The problem some of us face is, as we push for more research, we get resistance; as we push for tax subsidies, we get resistance.

Mr. Beckman, your agency is willing to go to bat strongly for additional moneys for research in this field?

Mr. BECKMAN. We have, in the last several years, approached the Congress with requests for funds to continue the research that was started some years ago. It is that research I am talking about.

The continuation of the research program leads in several years to we hope some breakthroughs in terms of cellulosic conversion, in terms of some benefits in reducing costs of distillation, things like that. That isn't to say we're going to come to you and ask for six times more than we have. We believe that the money we have asked for in the past several years has been adequate. We are making good progress. It is very focused research. I believe when we reach the point of having the research completed and transferred to industry, it will have a great impact on how they can——

Mr. SIMON. What about research on the thing that Mr. Donahue talked about, that is, the use of ethanol or in some way using it in the jet fuels? Is any research being done on that at all?

Mr. BECKMAN. Not at our department. We understand that a private group, in dealing with the aviation industry, has looked at it and they have been around throughout the government, to the Federal transportation authorities, looking for funds. I'm not so sure there are funds available for that segment of the market.

As you know, we have gone through some times when we've had to cut back on some funding of things, to deal with deficits. That's going to continue, I am sure. We had to look at the segment of industry that perhaps has the biggest impact. That is basically the passenger vehicle, the transportation sector. We look at automobile fuels as opposed to jet fuels, for example.

Mr. SIMON. Two final questions, one to you, Mr. Donahue.

You mentioned that I think the State has 11 vehicles that operated on pure ethanol?

Mr. DONAHUE. Yes, sir.

Mr. SIMON. What is your experience, both as to cost and to repair and servicing those automobiles?

Mr. DONAHUE. I can't answer specifically, Congressman. The automobiles are not in the Division of Aeronautics. I have talked with the people in the vehicles and they tell me that the maintenance on them is severely reduced because of less engine wear and they are running cooler.

The costs, I would think, in comparison with automotive fuel, the costs of operation is probably fractionally higher. That may be offset by reduced maintenance costs.

Mr. SIMON. Then if I may just ask your two pilots—where are your two pilots?

Mr. DONAHUE. They're at the aircraft.

Mr. SIMON. Oh, they're out there. You said we could ask them—I thought they were out here——

Mr. DONAHUE. You can ask me if you want to. I fly——

Mr. SIMON. You already indicated—I was just going to ask them—you find no difference in performance whatsoever.

Mr. DONAHUE. No; it takes a little more management as a pilot because of the introduction of a preheater, and because of the peculiarities of the Continental engine, which have intake stacks which are exposed to the airflow, they are constantly being cooled and we need to get the temperature of the alcohol up so that we get better burn, because it does burn rather than explode as gasoline does. But flying it, it performs within the parameters given in the book for climb, cruise. The only thing we have sacrificed is a little bit of endurance below 5,000 feet.

Mr. SIMON. And on the first part, how long does that take you, 1 minute or 2 to get in the kind of situation to get going? I gather there's a little more of a warming up process or something.

Mr. DONAHUE. No, no; the engine start is just routine. It compares to gasoline. In the winter, when it is very cold, we may have to have some preheat on the alcohol because of its burning qualities. But the engine warms up just as it would on gasoline and takeoff is not delayed.

Mr. SIMON. OK. Thank you.

Mr. DURBIN. In the interest of time, I will keep my comments and questions brief. We do want to have an open microphone for a few minutes for people in the audience.

I would like to mention to you, Mr. Donahue, that one of the subcommittees of the House Science and Technology Committee is interested in aviation research. Congressman Dan Glickman of Kansas is the subcommittee chairman and I am going to use this testimony, your testimony today from this hearing, to encourage Mr. Glickman to take a look into the development of the use of ethanol as an aviation fuel. I think it is very fascinating. Your experience indicates to me that even when you have to convert or modify an engine, you can show real savings. So let's see if we can get the bandwagon rolling for exploring some new possible uses in the future. We may end up having you fly that plane to Washington.

Mr. DONAHUE. I would be pleased to do it.

If I might just impose on you for 1 more second, one of the programs we would like to do, in conjunction with the University of Illinois, who does have a dynamometer and a Pratt & Whitney PT-6 turbine engine available to them, is to start a program where we would start blending in ethanol with jet fuel and measuring it on the dynamometer to see what parameters are produced and at what point, if at any point, the engine loses efficiency as we add ethanol.

Mr. DURBIN. Thank you. We will be looking forward to hearing the results of that as well.

Mr. Beckman, let me ask you a couple of quick questions, if I can. Does the Department of Energy support the Deficit Reduction Act provisions that resulted in increasing the exemption, the Federal exemption, on ethanol from 5 cents to 6 cents, and increasing the tariff to 50 cents on imported alcohol?

Mr. BECKMAN. Well, we don't normally take a position on tariff issues, but from an energy standpoint, the increase—the tax incentive is warranted. It's a good thing for the industry. It is something that supports our wish for a balanced energy mixture, and ethanol plays an important short-term role there.

Mr. DURBIN. The reason we asked, of course, is that there was some controversy within the administration about the tariff question.

Mr. BECKMAN. Yes.

Mr. DURBIN. We are importing—it's hard to believe. We are importing alcohol fuel from Brazil and it is growing, the amount that we're importing each year. There is a concern that we are, in fact, being used because of their own subsidy process in that country and our own ethanol industry is suffering. It's a complicated question. I wish it just applied to one thing but it applies to almost everything today.

The other thing that fascinated me about your testimony was on page 3. You said if leaded gasoline is phased out by 1993. How did you choose the date of 1993 in the phaseout of leaded gasoline?

Mr. BECKMAN. In terms of just looking at what happens with lead phase down and phasing out. If it is done by 1993, again which is a critical time—that's the year after the tax exemptions expire—looking at that particular octane enhancement market, when ethanol would have a higher demand, or we would expect it to, we simply looked at that and estimated what it would be like in 1993.

Mr. DURBIN. That was just used as a hypothetical date?

Mr. BECKMAN. Yes.

Mr. DURBIN. The reason I suggested was a spokesman for the administration several weeks ago in Washington suggested the date would be 1988. The Environmental Protection Agency is looking to phase out even more quickly, which I think argues for the timeliness of our hearing here today. If we have to replace lead as an octane additive, octane enhancer, and do it with something that is available on a market basis, we have got it in ethanol. What we have got to do is make sure that our industry is capable of meeting that increased national demand.

Mr. BECKMAN. Sure. The octane enhancer use obviously by refiners—many refiners have already made modifications to their refineries, so that they will be able to refine at higher levels with little increased costs. Their choice in terms of using an additive like an ethanol, a toluene or a benzene is one of cost. If they have already sunk capital costs into refinery modifications, it may be unlikely for them to use ethanol as an additive because they've already had that cost expended. But from the standpoint of some of the smaller refiners, some of the independents, they may have to use an ethanol. They may have to increase their demand for ethanol as an additive. That's what we're looking at in terms of ethanol and its use.

Mr. DURBIN. Thank you very much. Thank both of you for coming here today.

At this point—this is not the usual procedure but it is one I would like to follow. There are several people in the audience who have asked for the opportunity to make a brief statement. We invite anyone interested in submitting a written statement to do so. But those who are interested in making a statement will have a

microphone down here. They can make comments and it will be part of the official record here.

If persons should come up to testify, would they please identify themselves in terms of their name and address, and if they are representing an organization, the identity of the organization. We would ask you to try to confine your statements to 3 to 5 minutes, and as I said, if you want to go beyond that for written testimony, we would be more than happy to add it to the record.

Is there anyone who would like to come forward? I think two or three individuals indicated they would.

Mr. STAMME. Gentlemen, I'm not a public speaker. I'm a farmer. I recently have become a producer of ethanol.

Mr. DURBIN. Would you state your name and address, please?

Mr. STAMME. My name is Greg Stamme, and I'm from Metropolis or Brookport, IL, at the very southern tip of Illinois.

Mr. SIMON. You're Gene's son?

Mr. STAMME. Yes, sir, I certainly am.

You said 3 to 5 minutes. I've got a lot to say but I'll try to do that.

I am very disturbed with something that hasn't been mentioned here a whole lot today, and that's the Persian Gulf. First of all, I've got a brother carrying around a draft card, and that disturbs me quite a bit. I've been told or heard on the news that we could have a national incident over there any time.

Another thing that disturbs me, we've been talking a lot about subsidies here today, and has anybody even considered the amount of subsidies that goes to the Persian Gulf to protect our interest over there?

We've got a tremendous amount of surplus grain waste, starch, and sugar in this country. I spent the Fourth of July processing distressed corn and distressed wheat and waste candy from the local candy factory in our area into liquid usable fuels that could be used to replace this foreign oil that we've been so worried about. This candy would have wound up in the garbage dump. This grain, this distressed grain was in bad enough shape to possibly be thrown away. It wasn't fit for cattle feed. But you see the cattle there that's eating it. Those pictures were taken yesterday.

Of course, we've been talking about enzymes that's been developed, that can convert cellulose and many other things into alcohol fuels. I'm beginning to wonder if we even need the Persian Gulf. All these millions of dollars a day that's being spent over there, why can't they be spent in America, using the renewable products that we have to make renewable energy. I don't want to see my brother who's carrying a draft card have to go over there and die for no purpose at all. I don't think it's necessary.

I'll tell you a little bit about our plant, our alcohol plant. We've got a plant that will produce about—will process about 1,000 bushels of grain a day, corn, wheat, milo, any starch-type grains. From that grain we can produce about 2,500 gallons of usable liquid fuel. This liquid fuel we are using ourselves in the tractors and trucks that you saw pictures of there, and what we don't use ourselves we process into 200 proof and put on the open market.

We have been, of course, as I told you, processing waste candy that would wind up in a dump, a terrible pollution problem.

There's a lot of waste materials in the United States that could be used for liquid energy.

We spent last winter processing damaged grain, 95 percent damaged. This grain was black. It was completely unusable as far as feed, livestock feed. But through our fermentation and distillation processes, we made a usable feed out of that.

I just made a note here a few minutes ago. This fellow was talking about exports back here. Has anybody ever considered taking 30 percent protein spillage and exporting it?

Professor TYNER. It's done now.

Mr. STAMME. You said we're going to hurt our exports by processing grain into alcohol?

Mr. DURBIN. I think he clarified that, that he said beyond a certain production level of over 2 to 3 billion, that it was his opinion it would hurt our exports.

Mr. STAMME. I think that's a point that should be taken into consideration. We should ask these countries, "Can you use a 30-percent protein spillage coming from these ethanol plants?" and let's keep the energy in this country. Let them have the protein. They're after the protein in the food anyway.

Mr. DURBIN. Mr. Stamme, could I ask you a question. Do you have an estimate as to what it costs you to produce a gallon of alcohol or ethanol?

Mr. STAMME. Really, it's hard to say. We haven't really run any tests ourselves. We're just now getting into production, as a matter of fact, on a full-time basis. We have been trying to build this plant, trying to figure out how it can be done and how to do it, and we're just now starting to really do it. We have been at this for 6 years.

Mr. DURBIN. Who gave you the technological equipment and that sort of thing?

Mr. STAMME. We have built most of our equipment ourselves.

Mr. DURBIN. Based on a design that you got from somebody, or——

Mr. STAMME. We had help from a chemical engineer in our local vicinity. He helped design a column, and then we redesigned it after it didn't work ourselves and made it work. A good friend of ours told us a place to go to find out about a molecular sieve to process our alcohol into 200 proof. We did that.

One thing that really bothers me right now, I was told recently that I'm probably one of the only on-farm alcohol plants—that our operation may be the only one left in the State of Illinois.

Mr. DURBIN. I bet you we've got somebody here who could tell us. Is that true, Al?

Mr. MAVIS. That's true.

Mr. DURBIN. You're the "last of the Mohicans."

Mr. SIMON. Let me add, I have visited your farm and I have seen your operation.

Are you at the point where you think you're breaking even on it yet?

Mr. STAMME. I believe, with the utilization of the spillage in our cattle, we're feeding it wet. We don't use any extrusion processes. Just like it comes out of Staley. It goes to the cattle. I think we can possibly do all right.

One thing that needs to be pointed out here is the possibility on these small alcohol plants, we can—we've got the capability of feeding 1,000 head of cattle from this plant, 1,000 bushels of corn, or possibly more. We could put in a modern feeding facility for these cattle, and behind that put in a methane digester. This methane digester would produce the manure from these cattle into usable natural methane gas. This gas would be put back into these small ethanol plants—or let's say my plant, or anyone who would build one—be put back into the plant and create all of the electricity necessary to run that plant and a major portion, if not all, of the steam. So what I am talking about here is very little energy coming into this cycle and an enormous amount coming back out.

That's the potential of the small ethanol plant. But the only problem is, I'm the only one left. It's a sad situation.

Mr. DURBIN. And I think one of the other problems which ought to be stated is the fact that the capital investment now is being discouraged by the interest rates that people are faced with.

Mr. STAMME. That's true.

Mr. DURBIN. If you wanted to get into this, you would be facing a variable interest rate and hoping for the best that your corn prices wouldn't drive you out of the business completely.

Mr. STAMME. Well, I'm just like these people here. Right now I can operate on distressed grain, and that's what we're doing. You get up around $3.50 corn, I don't know if our plant, in the state it's in right now, could operate. It might. But we are using things that would have been thrown away. The farmer we bought the corn from, we gave him his price for it that we thought was reasonable. He would have just had to dump it somewhere if we hadn't of used it. And we made a valuable feed, plus liquid energy.

Mr. SIMON. Unless something has happened since the last time I talked to your family, you have not received 1 penny of money from the Department of Energy or anywhere else; all of our attempts to get any kind of assistance just ended up with nothing?

Mr. STAMME. For the small alcohol producer, nothing has been available that was really usable for us. A lot of people went out and bought turnkey plants, spent a world of money, paid a lot of interest, and go down the tube. There's a few that built them out of junkyards, like we built our plant—and I'm not ashamed to say it—there's a few of those that are going down the tube as well. I don't know when our turn will be. So we need to look into the capability of these small plants and what they can do. We would like to help.

[The prepared statement of Mr. Stamme follows:]

JUL 19 1984

SOUTHERN ILLINOIS AGRI-FOODS AND FUELS

ROUTE 1
BROOKPORT, ILLINOIS 62910

JUL 20 1984

The Honorable Richard Durbin
1307 South Seventh Street
Springfield, Illinois 62703

Dear Congressman Durbin,

Please accept this written statement into the record of the congressional hearing on ethanol which was held in Decatur, Illinois on Friday, July 6, 1984. Thand you for the opportunity to express our concern for the ethanol industry and the vital role which on-farm ethanol plants have in it.

Respectfully,

Gregory E. Stamme
Plant Manager

GES/bbs

We at Southern Illinois Agri-Foods and Fuels appreciate a great deal the opportunity I received Friday, July 6, 1984 to give unscheduled testimony in favor of on-farm ethanol production for liquid fuel. A small plant producing 2,500 gallons per day can seem unimportant, but very few people actually take the time to understand the impact that several thousant of these small plants would have in supplying the U.S. liquid energy demand. You may ask why should a congressman or senator support legislation to subsidise this industry. Contrary to what the majority would say or think, on-farm ethanol production can be the most energy efficient liquid fuel industry available to us today. Most people shrug their shoulders and say impossible before even considering our capability. Not only can we produce 2,500 gallons of usable liquid fuel daily, we can also feed over 1,000 head of cattle continuously from the distillers wet grain from out plant. Due to the fact that we would pump this product from the distillation column direct to the feed lot means that we will not need expensive and energy using extrusion and drying equipment. It has been proven that the extrusion and drying equipment used in large scale plants can consume 1/3 to 1/2 of the total energy requirements of the process. This energy is not used with wet feeding techniques on the farm.

Since the livestock will consume the whole stillage, this eliminates the necessity for on farm plants to need equipment to purify the waste water from an extrusion system which can be another expensive, energy-consuming process. This will keep liquid pollution from on-farm plants at a constant zero. An on-farm, livestock-feeding ethanol plant is never complete without an anaerobic methane digestor. The methane digestor will take the manure from the livestock and, through natural fermentation, produce natural or methane gas using very little if any energy in the process. This gas will then be piped back to the plant and used to produce 100% of the plants electrical service and a major portion if not all of the steam requirements.

With the use of methane gas in an on-farm ethanol plant we will have created an almost self-sufficient liquid fuel-producing facility. That means very little energy coming in and an enormous amount of liquid fuel being produced for the U. S. energy requirements. The manure, which will come from the methane digestor virtually odorless, will be used on the fields of local farmers as fertilizer. this eliminates all possibility of pollution.

With several thousand of these plants with their cattle feed lots scattered across America we would be able to take a large portion of erosion-prone farmland out of row crops and sow them down in hay. This would eliminate a major portion of programs and subsidies and help to put the American grain and beef industries back on their feet again.

On-farm ethanol plants have the capability of using enormous amounts of distressed or damaged grain. Grain that would normally be considered unfit for animal consumption can, through the cooking, fermentation and distillation process, be made very suitable for livestock feed. Our own plant spent last winter processing corn that was graded 95% damaged. The distillers wet grain from this corn was fed to cattle and they are currently ready for market. This corn would have had to be disposed of causing a pollution problem or virtually given to the local elevator if they would have accepted it, where it would have been blended with good corn. This blended grain usually ends up being exported to a foreign country and creates a hazzard to U.S. foreign trade. As it stands, the farmer received a reasonable price for his distressed grain. Our plant produced normal yields pound for pound of ethanol that could be expected from good grain and produced from an unfeedable raw material, a usable feed product.

Our on-farm plant has recently been supplementing our grain mash with waste candy from the local candy factory. This candy which is 99% fermentable sugars can be used in an on-farm plant and if handled properly it can be processed with almost no increase in energy consumption. In return we have received considerable increases in daily production and have produced liquid energy from a product that would have been taken to the local land fill and added to the pollution problem. We paid a reasonable price for this waste and in turn put money into the local community that would have not been there without our on-farm ethanol plant.

We have in our plant a continuous supply of clean water that has captured a great deal of heat from heat exchangers and condensors. Most of this hot water is recycled and used in the initial cooking of the grain mash which saves energy by not having to produce extra steam. The excess hot water will be used to efficiently heat a number of greenhouses which will supply local markets with fresh-picked, ripe vegetables in the dead of winter. These greenhouses will also use a large amount of the carbon dioxide given off by fermentation as a growth stimulant for the vegetables.

Our on-farm ethanol plant has the capability of eventually employing 20-30 people in our community. By adding waste sugars and starches to its production as we are doing with the candy, our plant can produce one million gallons a year. I'm sure that no one knows how many million deficit tax dollars are spent in the Persian Gulf daily. If America could only use a portion of this money that we will never see again to finance on-farm ethanol plants, in just a shor time we could have 1,000 plants producing across Illinois. These plants would employ 20-30 thousand people and have an annual output of one billion gallons. If we could see fit to put ten thousand of these plants across the United States, we could employ 200,000 to 300,000 people and have an annual production of ten billion gallons. Is this just a dream? I understand Hitler moved Germany to alcohol almost overnight with much less resources than we have here today. Was Hitler a better man than we are? I think not. Must we sit on our duffs and wait for the inevitable catastrophe to happen? There are many able-bodied people who are more willing to get their hands dirty at home rather than bloody overseas.

Oneother fact that needs recognition is this: under a nuclear attack probably nothing will survive, but if we were in a conventional war here in America 10,000 targets would be much harder to destroy than just a few large ones.

The only reason that on-farm ethanol production is a dying art is because no on-farm ethanol plant has ever been completed. Lack of government interest and financing caused these plants just to build to the point of alcohol production and, using conventional energy sources, produce themselves out of business. A complete, well-built, on-farm ethanol plant utilizing all of its potential resources is the most cost and energy-efficient means of producing liquid fuel today, contrary to what most will say.

It is as simple as this, you help the on-farm alcohol industry solve their problems and build their fuel plants, and the on-farm alcohol industry will solve your problems concerning energy. Have farmers let America go hungry? Farmers, given the chance, will not let America do without energy either.

I know you are concerned about our energy problems and are striving to find ways to solve them. Your first problem is convincing the remainder of our government officials, including the administration, of the ability that is at our fingertips. If we can be of any assistance at all in solving these problems, please don't hesitate to call on us.

Very truly yours,

SOUTHERN ILLINOIS AGRI-FOODS AND FUELS

Gregory E. Stamme

Gregory E. Stamme
Plant Manager

Mr. DURBIN. All right. I thank you. I know it's a long trip from Massac County up here to Macon County. We are glad to have you today. Give our regards to Metropolis and the friends down there. Keep up the good work.

Anyone else who wanted to testify?

Mr. LARKIN. My name is Jim Larkin. I'm a grain farmer from Towanda, IL, which is about 60 miles north and east of here. Our farm is a 680-acre family farm and we grow corn and soybeans. On our farm we have used gasohol exclusively since 1978 in two tractors, one pickup, and two family cars, and they have worked fine.

While this is good, we feel it would be much help in reducing the surplus corn and wheat if the tractor companies were encouraged to produce and the farmers were encouraged to use tractors that run on 100 percent ethanol.

In the summer of 1980, I converted one of our present gasoline tractors to run on 100 percent ethanol. It was a central conversion. It did have less power, but it did run and we used it quite a bit that summer to mow grass.

The articles I have here tell of the Ford Motor Co., their efforts to produce small ethyl-alcohol fuel tractors. I feel it would be good for the Federal Government to buy some of these tractors if they become available and make them available to farmers to use, like the County Agricultural Stabilization and Conservation Service, just so they could see that the alcohol fueled tractors could work and maybe get the ball rolling where the farmers could use the straight ethanol tractors.

That's all I have to say.

Mr. DURBIN. Thank you very much for your testimony. I appreciate your coming in.

Mr. SIMON. If I may just ask one question, are you related to the Larkin who was the Director of Agriculture?

Mr. LARKIN. I'm his son.

Mr. SIMON. You're his son. All right.

Mr. DURBIN. Anyone else wishing to testify?

Thank you all very much for coming out this morning. I hope that we have added to the national debate on this issue. I believe that the testimony we have received has been excellent, and I want to thank my colleagues, Joe Skeen from New Mexico, and Paul Simon from southern Illinois, for joining me here today in what is a rather unique hearing, where we have combined two committees which have mutual interest in this topic.

I am a little bit selfish in being happy that Decatur was the site for this, because I believe it is a good meeting place for those interested in the future of agriculture. Certainly the future of ethanol and the future of agriculture are running parallel. Thank you all for coming out this morning.

Mr. SIMON. If I may just add my own appreciation for the leadership Dick Durbin has shown in this area. I think it is extremely important that we explore every avenue here, that we do what we can to, in the words of Mr. Beckman, have a balanced energy program for this Nation. I think that's the aim that we have to have. It is not only in the interest of farmers; it is in the interest of our country. I hope we can get moving in that direction more vigorously.

Mr. DURBIN. Thank you, Paul.
[Whereupon, at 12:25 p.m., the hearing was concluded.]

DEVELOPMENTS IN THE PRODUCTION AND USE OF ETHANOL FUELS

TUESDAY, AUGUST 14, 1984

HOUSE OF REPRESENTATIVES, COMMITTEE ON SCIENCE AND TECHNOLOGY, SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT, AND THE COMMITTEE ON AGRICULTURE, SUBCOMMITTEE ON WHEAT, SOYBEANS, AND FEED GRAINS,

Clovis, NM.

The subcommittees met in joint session, pursuant to call, at 9 a.m. at Town Hall Auditorium, Eastern New Mexico State University, Clovis, NM, Hon. Richard Durbin presiding.

Mr. DURBIN. I would like to welcome you all to the joint hearing of the Agriculture Subcommittee on Wheat, Soybeans and Feed Grains and the Science and Technology Subcommittee on Investigations and Oversight.

My name is Dick Durbin. My home district is the 20th District of Illinois which is central Illinois, Springfield, Decatur, and Quincy.

I am joined today by my colleague from Wisconsin and comember of the House Science and Technology Committee, Congressman James Sensenbrenner from Wisconsin on my far left.

To the immediate left a familiar face, I am sure, your own Congressman, Joe Skeen. I am pleased to be here for the second of a continuation of hearings that we are holding on the question of alternative fuel technologies and I think it is entirely appropriate that these two subcommittees which represent agriculture and science and technology have come together to discuss ethanol and alternative fuel technologies.

The first hearing was held earlier this year in Decatur, IL, in my home district where we have an abiding interest in the future of ethanol. Half of the ethanol produced in the United States of America is produced within 100 miles of my hometown.

We believe there is a bright future for this fuel and we believe we should do everything we can as a nation to encourage it. Ethanol offers to us several things which are very important.

First, the energy independence. We are still dependent for one-third of our energy supplies on foreign imports. As we see the events in the Persian Gulf unfold, we realize how tenuous and fragile this supply is and how in the future it could be jeopardized if there were some political or military events which would occur to interrupt the supply.

Second, developing our ethanol program can result in substantial savings on our farm programs. In the United States today we as a

nation and as a government ask our farmers to hold back from production some 19 million acres of productive land. If that land can be used productively for such things as development of ethanol, we see that we can save money for our farm programs as well.

Finally, there is an environmental aspect besides the energy and agriculture. The announcement by the EPA that there will be the beginning of a lead phaseout from our gasoline offers us a unique opportunity in the agricultural sector of America to supplement the loss of lead as an octane additive with ethanol.

Today we have an excellent panel of witnesses who will be discussing the ethanol industry from the perspective in New Mexico and surrounding areas. At this point I would like to really step away from the ordinary protocol and ask if my colleague and friend, Joe Skeen, would be kind enough to chair this hearing in his home district and turn over the proceedings at this point to Joe Skeen and thank you for having me in New Mexico.

Mr. SKEEN. Thank you very much, Dick, and I want to welcome both you and Jim Sensenbrenner to my district, the Second District of New Mexico, and commend you to them, the people who live in this district, who work in this district, one of the greatest and most productive areas in the United States.

While I am at it, I want to introduce Scott Alley. Thank you for making the trip today.

I think Dick has done an outstanding job of outlining the framework on which these hearings were based. These hearings and information that we garner today is extremely important to this particular issue, particularly as it impacts on us of New Mexico because we are a large agricultural production State.

We are always looking for a new way to market our agricultural products because we don't always have the most benign marketing situation as it involves agriculture in the United States today.

It has been very tough on our agricultural producers. We understand that.

Also, this country needs alternative energy sources. I think Dick said it very well.

So, without a great deal more ado, I think it is extremely important, one, when we start this session out, to remind everybody that is here, first of all, we welcome all of you here, particularly those witnesses that we have asked to appear to make their presentations.

Each of you has been asked to give or supply us a statement. That entire statement will be entered into the record and made a permanent part of that record.

We would appreciate it in the interest of time that you summarize your statement as best you can in your own words. Brevity is very much priced.

We don't practice it too much in the Congress of the United States, but we would appreciate it very much on your part because we want to try to get through the panels as quickly as we can without losing any substance or without missing any cogent points that need to be aired and allowing us to question people who are on the panels.

So we are going to try to make it work that way and make it work very smoothly. Dick handled his hearings in Decatur, IL, and

did it very well. You know what our air transportation system is here in the Clovis area. We are proud of the commuter lines that we get, but we understand also their limitations. They have to leave and be out of here by 12-something, so we are going to try to expedite this thing.

We would appreciate your cooperation. Welcome to all of you. We are glad that you are here and we would like to have the first panel come up and that is Mr. Dave Hallberg who is president of the Renewable Fuels Association from Washington, DC, and our own representative, Hoyt Pattison from Clovis, and I want to say, too, that Hoyt and members of the ethanol community and production area in Clovis met with us in Washington.

We went to John Block's office, the Secretary of Agriculture, and I do appreciate their interest and the kind of work and time that they have put in on this issue. I am glad to have you here this morning, and we will begin with Dave Hallberg.

Thank you for being here.

STATEMENTS OF DAVE HALLBERG, PRESIDENT, RENEWABLE FUELS ASSOCIATION; AND HOYT PATTISON, A REPRESENTATIVE IN THE STATE LEGISLATURE OF NEW MEXICO

Mr. HALLBERG. Thank you very much, Mr. Chairman. It is a great pleasure for me to be here.

My name is David E. Hallberg, president of the Renewable Fuels Association. We are an industry trade association based in Washington, DC.

We were formed in January 1981 and my membership spans a broad spectrum from producers and marketers in the industry ranking from large participants like Texaco, Chevron in the oil industry, to large grain loaders like CDC and EDM, to the smaller producers and participants, including the Mountain Development Corp. here in New Mexico.

It is a great privilege for me to be here today. I want to commend you, Mr. Chairman, for your strong leadership in the Congress over the past years.

Congressman Durbin, a representative from a key production State, and Congressman Sensenbrenner, who with his dedication and bad back is here to find out what it is like in the real world.

We are very proud of what has been done here in New Mexico. I am sure the rest of the witnesses are going to give a better appreciation for the fact that New Mexico served as a laboratory, if you will, for some of the real hands-on experience the industry has had in the past 5 years.

I should say at the outset that there have been some bad experiences as well as successes. I think with any new industry that is the case. Fuel ethanol is no exception, but we are certain that the record will show that we have had more successes than bad experiences and that we are on our way to a very successful transition.

Mr. SKEEN. Dave, let me interrupt you just for a moment here.

Can everyone hear?

Fine.

Dave, go ahead.

Mr. HALLBERG. I think that it is appropriate that you are holding these hearings in this way in a joint committee format because the problem with the fuel ethanol industry is its synergism. In other words, it cross-cuts many different areas and the Congress, as you are all very well aware, is set up in committee jurisdictions in such a way that many times those overlaps cannot be dealt with and we are very happy you are doing it in this fashion because with the 1985 farm bill coming up, the Ways and Means Committee, appropriations committees, authorization committees, what have you, we think they are going to have to be able to look at the industry in a holistic fashion and not simply in parts and pieces.

I will be very brief. As you said, the statements will be submitted as written, so I would just like to touch on a few major points.

We have an opportunity, I think, to look at an industry that has gone from phase 1 of its development. We have come a long way from the early days when all they said about us was "drink the best and drive the rest."

The industry, in fact, is the major fuel alternative in the marketplace today. In 1984 we will sell over 5 billion gallons of 10 percent blend. That is 500 million gallons of ethanol in excess of that.

Nearly 200 million bushels of grain equivalent will be consumed for that industry. We have proven to the auto companies, who now warranty the product, and the EPA, who provides full waiver coverage for the product, that it is environmentally benign and compatible with present day engines.

We have shown that, in fact, it is an agricultural boon, that it fits in and it is compatible with the agricultural system with the high protein coal product which will have further uses in the future.

In short, the industry has shown that it works. We have one major problem and that is cost. That is why the Congress and your leadership is so crucial because you have, in effect, created a new industry and I think what you are trying to do here today is define whether or not that incentive, that subsidy, if you will, is a worthwhile investment in the Nation's future.

We would like to point out that, in fact, if you were to look at the ethanol incentive, as we call it, if it were to be, for instance, 90-cents as some have proposed, and the certain view that support it at Federal levels so as to obviate or at least minimize the need for safety standards, that you could probably divide that into three major components.

The first we would suggest is the 90-cent incentive would be 40 cents for the agricultural benefits that it provides, the new domestic enhancement that is so crucial. That amounts to about $1 a bushel when you look at 1 bushel for 2½ gallons of ethanol.

We maintain that is probably one of the cheapest agricultural supply demand programs that we have had in this country, especially in the last 15 years. In addition, we are creating productivity. We are not idle.

The second half of that, the 40 cents we would look at as an energy program and as we have indicated in the testimony, ethanol should not be equated to crude oil at $29 a barrel, but instead to finished motor gasoline product, because it is a high octane enhancing product.

If you look at a $42 a barrel imported gasoline figure, which is about what we are paying these days, 90 million barrels a year, ethanol at 40 cents a gallon or $16.80 a barrel stacks up very well.

Finally, the last 10 cents—we think $4.20 a barrel is a very good investment for the national security, industrialization, and environmental benefits this product brings.

In the committee's letter to testify, the first question that was asked was to look at ethanol's economic viability and then the second question that I would like to combine it to is can you look at whether ethanol's role or nitch is in the octane enhancement market.

As I have stated and will briefly summarize my oral remarks, you have to combine the two because ethanol has a short-term question of economic viability with incentives and a medium and long term, whereas when it moves into the octane enhancement market we believe it will become competitive with other petroleum-derived products and then can't compete.

Figures, I think, and attachments in my testimony speak for themselves. I would like to point out that we think it is an important watershed period that the Congress take a look at the ethanol as an octane enhancer.

We believe that because we have a window right now that will close very rapidly in the next 2 to 3 years in terms of whether or not major and independent refiners will use the product as opposed to other alternatives to get their octane.

The octane gap that will come from Mr. Ruckelshaus' announcement recently of 21 gram per leaded gallon standard probably by 1986 is very large and it will require the refiners to do one of two things—either increase their processing capabilities which largely means reforming, which is a very energy intensive process, and also very expensive or they will have to go to additives, among them ethanol.

The preference of major refiners is to go with reforming because they have the capability to make those investments and also the competition in the independent refiners are concerned about the anticompetitive effects of not allowing the independent refiners other ways to get that octane and we believe reforming is not the best way to go.

We concluded that crude oil loss of high energy severity reforming is very large, up to 10 to 14 percent per barrel crude. That does not occur with ethanol. In fact, as the Ethyl Corp. attachment shows, ethanol actually gives you another barrel of crude for each barrel of ethanol you put in.

We also think that long term there is a chance that the reforming which grates aromatics—BTX they call it—will put this country into the same position with aromatics as we are now in with lead in that EPA is beginning to find that those aromatics are carcinogenic and that, in fact, if we go that route, 10 to 15 years from now it may be that EPA will have to outlaw those.

So it is important that Congress send out public policy signals at this time so the investments can be made by the private sector industries in ethanol production.

You asked about R&D. Briefly, I would like to point out that because of the tax incentive, the private sector is spending great

amounts of their own funds on R&D. The advances are very dramatic. You see conversion, industry efficiencies, and the like, bringing the industry to the point where it can be cost competitive at the turn of the decade.

You also asked about a national security contribution. Without elaborating too much, I would like to point out two other areas that you think are important. One is the fact of disbursing facilities.

Here in New Mexico the perfect examples are the small community sites disbursed around the site. Since rural areas have another cutoff, that is an important capablity in the liquid fuels area.

You are also displacing liquid petroleum products—not true, and we think the potential exists and we would like to recommend that the committee look at the possibility of the creation of the strategic alcohol fuel reserve.

With reference to that General Accounting Office report which states that it could be more cost competitive or cheaper, I should say, in the current farm programs under certain circumstances and if you look at the ability of that program under the average of 100 million bushels of surplus grain a year over 10 years, that is 2.5 billion gallons of ethanol to be sold as a complement to the SPRO, which is 6 million barrels or almost 10 percent of the product, so it is not an insignificant contribution. We believe it would serve both the agriculture and energy purposes.

Lastly, the question you asked as to whether or not the current Federal incentives are enough.

Again, we elaborated on what we think should happen because of the balkanizing nature. It would be much more effective if we could get a total elimination of the Federal tax on ethanol blends so as to make a more efficient marketing system and not worry about the State borders and the different rules that are set up so ethanol could be used as an octane enhancer.

We believe if this were done, the investment back to the budget would be more than set off by the increased revenues and that the industry would grow and make a contribution to the octane gap that we now have.

I would like to briefly just make three or four other recommendations, perhaps, for consideration in the omnibus bill that may be considered in the reconciliation act next year.

In addition to federalization, we believe it is critical that the energy investment tax credits are extended as other renewable technologies have asked, and Chairman Rostenkowski now has under considertaion for the Ways and Means Committee.

As I mentioned, we think the strategic alcohol fuel conservation ought to be considered as a component in the 1985 farm bill.

Fourth, we think statutory language in the farm bill ought to be considered that would induce Farmers Home Administration to better implement its loan guarantee programs which in the past several years have been implemented, if at all, with a great degree of hesitation and obstacles.

Fifth, we would recommend that the committee look over DOE and U.S.D.A's research priorities. We have met with them recently. They are prioritizing liquid fuel R&D programs and we think they are deceptive with more emphasis on ethanol R&D.

Especially lastly, we would like to recommend that more consideration be given to using Public Law 480 programs and some of our trade negotiations with other nations to advance the use of the product as food grade material, as is being considered by mountain development and other firms.

Some statutory authorization already exists in the 1985 farm bill.

I would like to thank you all once again for your leadership in support of the industry. We hope that we can respond to the challenges that you set forth.

Thank you very much.

[The prepared statement of Mr. Hallberg follows:]

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REMARKS OF DAVID E. HALLBERG

PRESIDENT, RENEWABLE FUELS ASSOCIATION

BEFORE THE JOINT HEARING ON THE

SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT,
HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY

SUBCOMMITTEE ON WHEAT, SOYBEANS, AND FEED GRAINS
HOUSE COMMITTEE ON AGRICULTURE

14 AUGUST 1984

CLOVIS, NEW MEXICO

Thank you very much, Mr. Chairman. It is a great privilege for me to have this opportunity to represent the U.S. renewable fuels industry before this important joint committee field hearing here in New Mexico, which in so many ways has served as a laboratory for the development of an exciting new industry--the fuel ethanol industry--that holds so much potential for the nation. I would like to especially commend Congressman Skeen, New Mexico's strong voice, for fuel ethanol development in the Congress and Congressman Richard Durbin, who represents a key fuel ethanol production district in Illinois, for their extremely effective efforts in the past in support of the industry's development, as well as for their vision in realizing that any new industry must make its way through bad experiences as well as successes. The U.S. fuel ethanol industry is confident that the growing official record of its development over the past five years will clearly demonstrate that its successes have far outweighed its shortcomings, and that the future holds immense promise for its further development and contributions to the nation's agricultural, energy, environmental, and reindustrialization objectives.

In view of the time constraints, I would like to briefly address several of the major points cited in the Science and Technology Committee's letter of invitation to testify. The responses to these points should provide at least a general understanding of where the U.S. fuel ethanol industry has come from, and where it is going.

- WHAT IS THE NEAR- AND LONG-TERM ECONOMIC VIABILITY OF FUEL ETHANOL? and
- WHAT IS ETHANOL'S ROLE AS A GASOLINE OCTANE ENHANCING ADDITIVE, ESPECIALLY IN LIGHT OF RECENT EPA ACTIONS TO RESTRICT THE USE OF LEAD AS A MOTOR FUEL OCTANE ENHANCER?

I have elected to combine these two separate issues because the first cannot be answered outside of the context of the second. Many people are largely unaware of the fact that the "gasohol" of the 1979 gasoline line days has quietly passed away to thrive in simply another form: ethanol-enhanced gasoline. Rather than calling it "gasohol", most marketers of ethanol-enhanced gasoline are now labeling their blends "super unleaded with ethanol", or "unleaded plus", and so on. In 1984, U.S. motorists will buy over 5 billion gallons of ethanol-enhanced motor fuels, which represents roughly 100 billion miles of smooth performance. Ethanol has now come to be regarded as not only a unique gasoline extender--by displacing 10 percent of the gasoline in a blend--but one of the most effective octane enhancing additives available to U.S. refiners. This dual capability is soon going to become of even greater value in light of EPA Administrator Ruckelshaus' recent announcement of his agency's intention to seek the substantial reduction of lead in gasoline by January 1, 1986 (announced on July 30 of this year).

In the interests of time, I would like to confine my remarks here to two general questions: to what extent does fuel ethanol serve as a suitable replacement of tetraethyl lead as a motor fuel octane enhancer; and, given the approximate "octane gap" that is expected to result from the elimination (or near-elimination) of lead, to what extent could U.S. fuel ethanol production capacity be expanded, and what share of that gap could it realistically meet?

As Attachment I attests, it is possible to measure the expected octane gap that would result from the likely EPA lead ban in terms of "gallons of alcohol equivalent". An analysis conducted by a highly respected environmental consulting firm, Herman and Associates, indicated that a total ban on lead would generate an "octane gap" in U.S. refineries of up to 70 billion gallons of "alcohol equivalent" over the cumulative period 1984 through 1992. In recent testimony before this Joint Committee's field hearing in Decatur, Illinois on July 3, 1984, the Deputy Director of the Department of Energy's Office of Alcohol Fuels stated that a total phaseout of leaded gasoline by 1993, if "all lead were replaced by ethanol...35 to 70 billion (cumulative) gallons of ethanol equivalent octane enhancers would be needed between 1986 and 1992." It is clear, then that a lead ban would give rise to a significant need for ethanol.

The recognition of the substantial "octane gap" that this lead ban would create leads us to the next question: where does ethanol fit in with regard to the range of alternatives available to refiners, both in terms of ability to do the job, as well as economic competitiveness? This is an especially important public policy question in light of the potential anti-competitive effects a lead ban could have on the petroleum refining industry due to a possible squeeze on independent refiners. For example, if increased fuel ethanol availability could contribute to increased independent refiner competitiveness, there would be yet another benefit to the nation from expanded ethanol production.

The past five years of the fuel ethanol industry's development has made it abundantly clear that ethanol is a readily accepted and technically suitable--if not superior--octane enhancing additive. Categorized an an oxygenate by refinery experts (as is methanol), ethanol has received rigorous scrutiny in recent months by objective experts ranging from the Ethyl Corporation to Ashland Oil, Inc. In addition to the fact that 10 percent ethanol blends are covered under warranty by all of the major automobile manufacturers, and receive full waiver coverage by the EPA, the technical data also shows that ethanol has one of the highest octane ratings (Research octane blend value - 132, Motor 103), and its costs per octane number barrel are extremely competitive as long as the tax incentives are considered (see Attachment II).

Ethanol has superior effects in a second very important technical area that must be considered when measuring the cost/benefits of banning lead: its ability to reduce the so-called "crude oil penalty" that arises when lead is replaced by energy intensive refinery methods such as high severity reforming. Attachment III is an excerpt from a recent Ethyl Corporation analysis of the leading oxygenates, which found that ethanol was substantially more effective than the other contenders in terms of displacing imported crude oil, in that it served not only the 10 percent displacement function, but also provided an additional crude oil savings by reducing the amount of energy intensive reforming required to achieve the same octane levels.

For a more detailed view of how ethanol can be compared against the range of alternatives available to a refiner, I have attached graphs taken from a recent presentation made by Mr. Wayne D. Kuhn of Arco Chemical Co. at an international alcohol symposium in Canada. Attachment IV sets out the basic options now available to refiners--increasing reformer severity, adding incremental butylene alkylation, or purchasing toluene--and their approximate costs. Attachment V then sets out the conventional process octane options available through refinery upgrades (which are highly capital intensive) and their costs. Attachment VI lists the conventional process octane options that can be achieved through chemical reactions (and which face various feedstock constraints of one type or another in most cases) and leading additives and oxygenates, with the most meaningful line for the purposes of this analysis the "VALUE ¢/GAL". It can be seen that, of all the additives considered by Arco and Sun (who themselves are not involved in the fuel ethanol business, and must therefore be considered "objective"), ethanol had the highest value to the refiner in terms of octane enhancement effects.

Hopefully, this brief review of the literature has securely established the argument that ethanol is, on balance, one of the best, if not the best, options available to U.S. refiners to replace lead as a motor fuel octane enhancer. The only obstacle to its widespread use, it would seem (other than the elusive one of the refiner leeriness of a new product that they can't directly control) is the question of price.

Obviously, this is where the question of the appropriate role of public policy comes up: to what extent is it merited for the federal government--on the basis of the evidence of ethanol's national benefits in terms of agricultural program cost reductions, new economic activity generation, energy security augmentation, and now, potential for significant contributions to easing of the octane gap in an environmentally benign way--to establish a nationally uniform tax incentive level sufficient to stimulate a major expansion of fuel ethanol production?

In recognition of the country's need for a greatly expanded domestic outlet for agricultural commodities, the National Corn Growers Association has officially adopted as one of its top legislative priorities the conversion of 1 billion bushels of grain equivalent into ethanol by 1990--a five-fold increase in current ethanol production capacity. In rough numbers, the attainment of this objective would mean that 10 percent of the nation's corn crop would be meeting up to 50% of the projected cumulative octane gap (in ethanol equivalent). Given the appropriate public policy signals, the U.S. fuel ethanol industry can meet such a goal. In fact, only one signal would likely be necessary to stimulate the desired response: a complete elimination of the Federal excise tax on gasoline for ethanol-enhanced fuels.

Hopefully, the evidence offered here will offer the Committee a view of two key facts about fuel ethanol's economic viability. First, in the near- to mid-term, ethanol's unique synergistic ability to combine agricultural benefits (e.g., reduction in taxpayer outlays for surplus agricultural programs like PIK, improvement in farm income) with its liquid fuel supply contributions (oil import reductions and improvement of refinery economics as a substitute for lead) and its environmental and reindustrialization effects enables it to justify the need for temporary public policy support such as the tax exemptions as a very cost-effective investment that is balanced by substantial savings in other areas. In fact, the recent General Accounting Office analysis that was conducted over the past two years concluded that the fuel ethanol industry's net impact on federal outlays was essentially neutral, once all factors were considered. (2) Second, in the long-term (e.g., beyond 1992), the fuel ethanol's ability to serve as a high value octane enhancer capable of displacing banned lead and other petroleum-derived additives will enable it to become competitive without the benefit of tax preferences.

o<u>DESCRIBE THE INDUSTRY'S CURRENT R & D AND TECHNOLOGY EFFORTS, AND WHAT POTENTIAL ECONOMIC BENEFITS CAN BE EXPECTED</u>. While it is a corrollary benefit that is all too often overlooked, the existence of the tax incentives has stimulated a substantial degree of private sector R & D spending that would otherwise not have occurred, due primarily to the profit potential offered in the marketplace. Since most of this R & D work is now proprietary because it is being conducted by private firms without federal government assistance due to recent budget cuts, it is hard to be specific about the exact technologies and advances that are

being made. However, we know that the R & D efforts that are underway in the areas of cellulose conversion (either acid or enzymatic hydrolysis); improved feedstock productivity via bioengineering breakthroughs and the like; and more efficient end uses for the renewably-derived ethanol in both transportation and other industrial applications are experiencing encouraging success. Research priorities within the Department of Energy are now being reevaluated, with an eye toward the fact that U.S. energy problem is overwhelmingly one of liquid fuels dependence, since other sectors of the economy are either now almost totally free of crude oil dependence, or are at least capable of fuel switching (e.g., utilities able to switch from residual fuel oil to coal, for example). Dramatic research breakthroughs are expected to occur soon in related areas, as well, such as with the ability to utilize the high protein concentrate from the fuel ethanol production process (which is now a byproduct used very successfully domestically and abroad as an animal protein supplement), as a human food material which would have immense value as a concentrated protein product for food aid and other purposes. Such developments have the potential of someday transforming ethanol into the "byproduct", with the protein material and other coproducts (such as the lignin from cellulose conversion processes now under demonstration) becoming the primary, highest value product stream. It is mind boggling to consider what the immense potential of fuel ethanol is when viewed in the context of the massive breakthroughs expected of bioengineering efforts now underway, and not hard to imagine the day when major percentages of our transportation fuel will be derived from renewable substances ranging from grains to food processing wastes to forestry residues at fractions of the cost of petroleum-derived fuels.

o<u>WHAT IS THE INDUSTRY'S NATIONAL SECURITY CONTRIBUTION?</u> As with any other liquid fuel alternative that can be expected in the future, fuel ethanol will not offer a panacea in terms of national security. However, it does offer a substantial contribution, not only by lessening the nation's dependence on unstable supplies of foreign oil, but also by doing so in a way that disperses production facilities around the country, rather than centralizing them as is the case with more capital intensive technologies such as nuclear or oil shale. In addition, these fuel ethanol plant sites are more than likely to be in the rural areas of the country, which are especially vulnerable to oil supply disruptions because they sit at the "end of the pipeline" as a result of major oil companies pulling out of rural areas, and the remaining fuel suppliers in those areas being almost exclusively dependent upon the world oil spot market for fuel.

It should also be noted that, in terms of displacement of oil imports, fuel ethanol has a very significant potential. For example, when viewed against the backdrop of U.S. finished motor gasoline imports, which will reach roughly 90 million barrels in 1984 and are on the rise, the fuel ethanol industry could easily be expected to attain production levels capable of displacing at least 50%, of not all, of that amount. In 1984, U.S. fuel ethanol production will exceed 10

million barrels. A level of production consistent with the National Corn Grower Association's target of 1 billion bushels of corn into fuel ethanol by 1990 would mean a five-fold increase in production, or more than a 50% displacement of U.S. finished gasoline imports. This is an appropriate way to measure fuel ethanol's displacement capabilities for another reason, in that it is more accurate to compare fuel ethanol's characteristics with finished motor gasoline than it is with crude oil. This is so due to the fact that ethanol is already "refined" and is a high value, 130 octane number product more comparable to toluene or benzene. On the other hand, imported crude oil is at least 50% "low value" products such as napthas and resids, and up to 10-20% of it is consumed in the refining process itself. Consequently, to compare the value of high value anhydrous fuel ethanol with $29.00/barrel unfinished crude oil is not relevant; the fuel ethanol should be compared at least to the imported finished motor gasoline which now stands at roughly $42/barrel.

A final consideration of fuel ethanol's national security dimension is the significant potential that exists for the creation of a Strategic Alcohol Fuel Reserve (SAFURE) that, over time, could be built up from surplus agricultural commodities and stored throughout the U.S. in dispersed locations as a complement to the existing Strategic Petroleum Reserve (SPRO). In the recent GAO analysis, the SAFURE concept was carefully analyzed and the conclusion was that, under certain conditions, a SAFURE program was not only technically feasible, but also could be cheaper than existing farm program costs. On page 46 of the report (The Importance and Impact of Federal Alcohol Fuel Tax Incentives", GAO/RCED-84-1, June 6, 1984), it was stated: "we estimate SAFURE would be between $1.16 and $1.60 cheaper than existing program costs when the revenue from government corn sales is not considered." The GAO analysis recommended that the SAFURE concept had sufficient merit to warrant more precise data and closer scrutiny before a final decision was made.

The processing of an average of 100 million bushels of surplus grain each year on a competitive bid basis by existing private sector fuel ethanol facilities with surplus capacity could produce enough ethanol over ten years to equal 2.5 billion gallons of ethanol, or roughly 60 million barrels (a little less than 10 percent of the total SPRO target). Obviously, such an approach does offer a very substantial national security benefit. In addition, the implementation of such a program would have an advantage over exclusive reliance on the SPRO, since the fuel ethanol industry then in place would be an ongoing, renewable source of liquid fuel supplies even after the SAFURE were tapped in the event of a interruption, unlike the case with a SPRO.

oARE CURRENT FEDERAL INCENTIVES SUFFICIENT? This final issue raised by the Committee is indeed the fundamental question. As the fuel ethanol industry enters "Phase Two" of its development, the experience of its first five years provides strong evidence that the current balkanized state of the national market due to the difference among the

32 state tax incentives (see attached state map) is a major deterrent to the efficient and orderly expansion of production and use. This is due to two primary reasons: first, because the current level of the Federal exemption (now 5¢ per gallon, due to become 6¢ on January 1, 1985) is not quite sufficient to bring about the participation of the major oil company and refiner users, and the state incentives are necessary to make the marketing of the blends economic, the tenuousness of the state incentives in the minds of potential marketers and investors has retarded their participation. Investors need the stability and certainty of at least the Federal expiration date of 1992 in order to feel that they can recover their investments, and the natural volatility of state level incentives has eroded this needed confidence level. Second, the current balkanization of state level incentives serves as an impediment to the efficient marketing of ethanol in its highest value use across state borders as an octane enhancer and substitute for lead.

What is needed is the creation of a nationally uniform incentive level for renewably-derived fuel alcohol blends that is sufficient to allow the termination of the state incentives. This makes sense for several reasons, including the fact that the federal government has historically been responsible for the direction of both energy and agricultural policy, which is where the fuel ethanol industry impacts most. During the last Congress, legislation was introduced (HR 4105 and S. 1931) to eliminate the Federal excise tax on fuel ethanol blends. These measures were supported by a broad spectrum of the Congress, including key supporters like Congressman Skeen and Durbin, but the effort fell short during final consideration of the Tax Reform Act of 1984 when the tax was reduced only by 1¢, to a total 6¢ exemption.

There is one other provision of these bills that make sense, and should still be considered as part of another attempt to achieve the national uniformity if the Congress believes it is warranted, and that is the reimbursement of the Highway Trust Fund by general revenues for the losses caused by the use of the excise tax exemption. It has been demonstrated beyond a doubt that the general taxpayer is the one who benefits from a vigorous fuel ethanol industry in the way of reduced agricultural outlays, stimulated economic activity, improved environmental impacts, and increased national security. It is not right that one segment of the economy--the highway user--should have to bear the industry's start-up costs alone.

The attached list of the various groups who came out in support of the legislation to uniformize the fuel ethanol industry is a dramatic testimony to the broad appeal of an expanded industry. Interests ranging from environmental to agricultural to labor to independent refiner representatives committed themselves publicly to the elimination of the tax on fuel ethanol blends in recognition of the benefits that would accrue to their particular interests. There are very few new industries that can point to that sort of broad support and impact, and it would seem to make sense for the two Committees represented here today to consider the means in which all of these various objectives can

be accommodated, (perhaps during consideration of the 1985 Farm Bill). While no panacea, an expanded fuel ethanol industry can go a long way towards relieving many of the nation's agricultural, energy, environmental, and economic problems.

Once again, Mr. Chairman, I greatly appreciate the opportunity to make our views known. I would be happy to answer any questions. Thank you.

For Release: May 10, 1983

ATTACHMENT I

HERMAN & ASSOCIATES
SUITE 300
2550 M STREET, N.W.
WASHINGTON, D.C. 20037

Marilyn J. Herman (202) 775-1030

RECENT US COURT RULING SUGGESTS MAJOR NEW LEAD REDUCTIONS

Herman & Associates Quantifies Market Impact
Of Potential EPA Lead Ban on Alcohol Market.

According to Herman and Associates, a recent Federal Appeals Court decision upholding the U.S. Environmental Protection Agency's gasoline lead phasedown regulations may have a significant impact on the market for alcohol fuels. The demand for alcohol and other octane boosters may triple if EPA follows the Court's suggestion to ban lead.

On April 22, 1983, the U.S. Court of Appeals for the District of Columbia not only held that the EPA lead phasedown ruling was appropriate but also found:

> [The] demonstrated connection between gasoline lead and blood lead, the demonstrated health effects of blood lead levels of 30 ug/dl or above, and the significant risk of adverse health effects from blood lead levels as low as 10-15 ug/dl, would justify EPA in banning lead from gasoline entirely. [Small Refiner Task Force v. EPA, at pp. 48-50.]

According to an analysis done by Herman and Associates of the lead phasedown regulations issued by EPA in November 1982 and sustained by the Court of Appeals, the required reduction of 115 billion grams of lead over the next eight years is the octane equivalent of 23 billion gallons of alcohol, if alcohol alone were used to meet refiners' octane needs. For 1984 and 1985, the required lead reduction of 7.1 and 11.9 billion grams is the octane equivalent of 1.42 and 2.38 billion gallons of alcohol respectively.

If EPA were to ban all lead in gasoline as suggested by the U.S. Court of Appeals, refiners would have to cut lead usage by 342 billion grams versus 115 billion grams over the next eight years under the lead phasedown rule. This would nearly triple the market demand for high octane blending components such as alcohol to replace lead. If alcohol alone were used to replace the 342 billion grams of lead, this would require nearly 70 billion gallons of alcohol. In addition to ethanol and methanol, refiners can use MTBE and TBA as well as refining gasoline more severely to boost octane.

Herman & Associates is a Washington-based firm consulting in energy and environmental policy with emphasis on alcohol fuels. The firm was founded by Marilyn J. Herman, the former Deputy Executive Director of the U.S. National Alcohol Fuels Commission.

TABLE 1

OCTANE IMPROVEMENT ECONOMICS

Source	Octane Cost Cost Per Octane Barrel (R+M/2)
Incremental reforming	28.0¢
Lead	7.2¢
Ethanol	18.8¢
Methanol/TBA	21.8¢
Toluene	58.6¢

Assumptions

Other Source	Cost $/gal.	Research Octane Blend Value	Motor Octane Blend Value	RVP
Ethanol	1.00	132	103	19
Methanol/TBA	0.85	118	93	42
Toluene	1.10	113	94	2
Gasoline	0.90	91	83	10
Butane	0.70	94	89	59

NOTE: Ethanol cost of 1.50 $/gal. FOB plant minus 0.50 $/gal. Federal exemption credit.

SOURCES: Octane costs for reforming and lead: Reference 5.
Enhancer assumptions: Greer, D.C. and W.J. Kulakowski, "Use of Ethyl Alcohol as an Octane Booster," 1982, NPRA Annual Meeting, March 21-23, 1982.

ATTACHMENT III

VALUE OF OXYGENATES IN MOTOR FUELS

G.H. UNZELMAN
Ethyl Corporation
Baton Rouge, Louisiana

Presented at the
46th Refining Midyear Meeting
American Petroleum Institute
Chicago, Illinois
May 12, 1981

Unfortunately, the Clean Air Act of 1970 continues to impose unrealistic emission standards on car manufacturers. Unleaded gasoline required for catalytic converters continues to grow in volume as required by new vehicles. Today, 50% of the gasoline sold in unleaded.

The crude oil penalty for this unleaded market is growing daily and will reach 110-million barrels per year in 1981. This is an insidious loss because it is unnecessary and it increases incrementally on a day-to-day basis.

Figure 3 demonstrates the crude oil conservation possible with oxygenates blended in unleaded gasoline. Petroleum energy conserved in

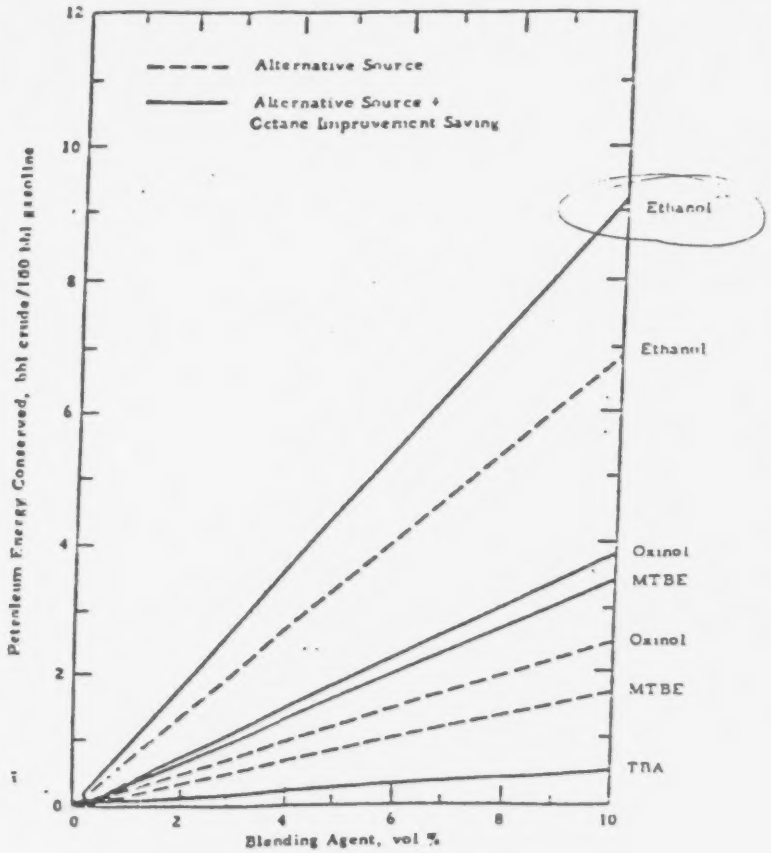

Figure 3. Crude Oil Conservation With Oxygenates in Unleaded Gasoline

ATTACHMENT IV

CONVENTIONAL PROCESS OCTANE OPTIONS

PROCESS	PRODUCT OCTANE (R+M)/2	CAPITAL* INVESTMENT $MM	OCTANE COST ¢/OCT-BBL	COMMENTS
CHEMICAL REACTION				
C_3 = DIMERIZATION	92	20	170	REFINERY PROPYLENE
C_3 = ALKYLATION	91	75	230	REFINERY PROPYLENE
C_4 = ALKYLATION	94	50	65	OLEFIN NORMAL BUTYLENES
METHYL-T-BUTYL-ETHER	110	160	45	ISOBUTANE FEED

* FOR 20M BBLS./DAY UNIT

ATTACHMENT V

COMPONENT	VALUE ¢/GAL	MARKET PRICE ¢/GAL	PROFIT MARGIN ¢/GAL
METHANOL	108	53	55
ETHANOL	133	165	-32
ISOPROPANOL	116	210	-94
N-BUTANOL	102	225	-123
SEC-BUTANOL	103	185	-82
TOLUENE	125	121	4
ARCONOL®	117	105	12
OXINOL™50	113	76	37

NB: The prices listed above are intended for comparison purposes only and do not necessarily represent true current market values.

From "the Use of Oxinol™ and Other Alcohol Blending Components in Gasoline", DeJovine, Guetens, et. al. (ARCO) and Davis, Douthit, Et. al., Sun Company, given at the 1982 Fuels and Lubvicants Meeting of the National Petroleum Refiners Association, November 4-5, 1982, Houston, TX.

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ETHANOL:
NATIONAL SECURITY IMPLICATIONS

A Report of the Energy and Strategic Resources Program

Charles K. Ebinger, Program Director

Center for Strategic & International Studies
Georgetown University • Washington DC

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CONCLUSIONS

Ethanol can make a positive contribution to U.S. energy security. It is a useful substitute to petroleum-based fuels. While ethanol currently requires tax subsidies to compete with gasoline and gasoline-derived additives, ethanol's valuable properties combined with the prospect of technological breakthroughs indicate that these subsidies should continue until 1992, when ethanol should be a mature industry. By 1992, even without an extension of existing tax subsidies or new tax supports, ethanol production could be as high as 2 billion gallons.

Ethanol displays several strengths important to the nation's energy security:

- It is a liquid fuel at a time when liquid fuel dependence presents our greatest energy vulnerability. The United States is still 97 percent dependent on oil as a mobility fuel. Transportation is the most important bottleneck to reducing America's vulnerability to future oil supply disruptions.

- Ethanol displaces imported oil on at least a 1:1 basis. If 2 billion gallons of ethanol are produced in 1990, U.S. oil imports would be reduced by 47.6 million barrels per year and the United States would save $1.4 billion in its annual oil import bill.

- Ethanol can be easily assimilated into the existing supply and marketing systems as an octane booster or as a fuel extender with gasoline. By the end of 1983, ethanol enhanced gasoline sales are expected to represent more than 4 percent of the U.S. gasoline market. Current demand is "supply constrained."

- Ethanol's increasing use as an octane enhancer to replace lead is a key component of the industry's future market growth. Because of recent EPA restrictions on lead use, projections are that the nation's refineries will face a 20 billion gallon alcohol-equivalent "octane gap" by 1990, and ethanol is expected to meet a significant share of that new demand. By positioning itself against the more expensive octane enhancing additives that are derived from depletable resources, renewable-based ethanol is likely to be competitive without tax credits toward the end of this decade. Increasing ethanol use at the refinery by reducing the amount of energy-intensive reforming needed can also reduce crude oil imports on more than a 1:1 basis, further contributing to energy security objectives.

billion gallon capacity level, assuming no technological improvements, without significantly increasing corn prices. With 2 billion gallons of ethanol production in 1990, net gain from co-product exports could be about $1 billion per year.

- Compared with gasoline, there are no major environmental problems associated with ethanol production. In fact, if EPA's lead-emission rules tighten, the ethanol industry's contribution to clean air would increase.

There are, however, certain disadvantages to ethanol production that need to be considered:

- Compared to other policy options such as the Strategic Petroleum Reserve (SPR), ethanol may be more expensive in the short run. Much depends on policy changes concerning use of the SPR, development of a Regional Petroleum Reserve, and trends in private oil stocks. A decline in private stocks may negate the security contribution of the SPR, at which point ethanol subsidies must be compared to the cost of providing incentives to hold private oil inventories. Ethanol could play an important role in an extended oil disruption as the SPR is, in effect, an "exhaustible" policy instrument. In a long, severe disruption the SPR will be quickly consumed.

- Ethanol's potential contribution to overall energy security is small under almost any assumption, although marginal quantities of fuel can be important in a crisis, especially if available in regions of the country where the oil infrastructure system is disrupted. Ethanol, therefore, should not be viewed as a panacea for resolving the nation's energy vulnerability.

- Ethanol, while ideal for blending with gasoline, is limited in other situations at this time. Blend ratios beyond 20-25 percent require engine modifications; use in diesel engines has not yet been commercialized; use for heat applications is not practical owing to the lower heat content of the fuel; and, like all other alternatives, it is not as flexible as crude oil.

- Ethanol provides no sprint capacity or significant emergency response capability; most plants are now operating at maximum levels and market all their output to dedicated uses. This limits the availability of <u>extra</u> ethanol in an emergency but does provide farm areas with a fuel that would otherwise not exist. Ethanol availability currently provides only marginal benefits to agricultural areas. The development of new technologies and their application to a farm "energy" system may, however, ultimately provide greater fuel security for farmers.

- Ethanol technology is available and operational without shake-down or pilot operations. By 1984 industry capacity will represent 500 million gallons per year. Synthetic fuels development still represents a largely unproven commercial-scale technology and will not be available in significant quantities for some time.

- The raw material, grain, is domestically produced, as is the fuel, and, if levels of production continue as predicted during the next ten years, readily available. New, less expensive cellulose or waste materials are being researched as possible future feedstocks for ethanol production. These technologies are very promising and may be available well before production reaches the 2 billion gallon level.

- Ethanol production does not compete with food production. Nor will ethanol production at the 2 billion gallon per year level affect feed exports. Exports of both bulk corn and other coarse grains coupled with processed high-protein ethanol co-products will be available in world markets at competitive prices. The promise of new conversion technologies and supplemental ethanol feedstocks additional to corn could provide the option of both feed and fuel at levels of ethanol production far greater than those existing today.

- Production can be decentralized and under the proper conditions scaled down without unacceptable economic penalties although significant economies of scale are achieved in plants of 20-60 million gallons per year capacity. Decentralized development also addresses this important security concern: movement away from the type of centralized energy production and distribution system that can be easily and systematically disrupted.

- New capacity can be added reasonably quickly--under some scenarios, this could be beneficial when facing oil supply cutoffs of more than 12 months. Future oil supply disruptions could last longer than previous ones, and under these conditions ethanol's contribution would be positive.

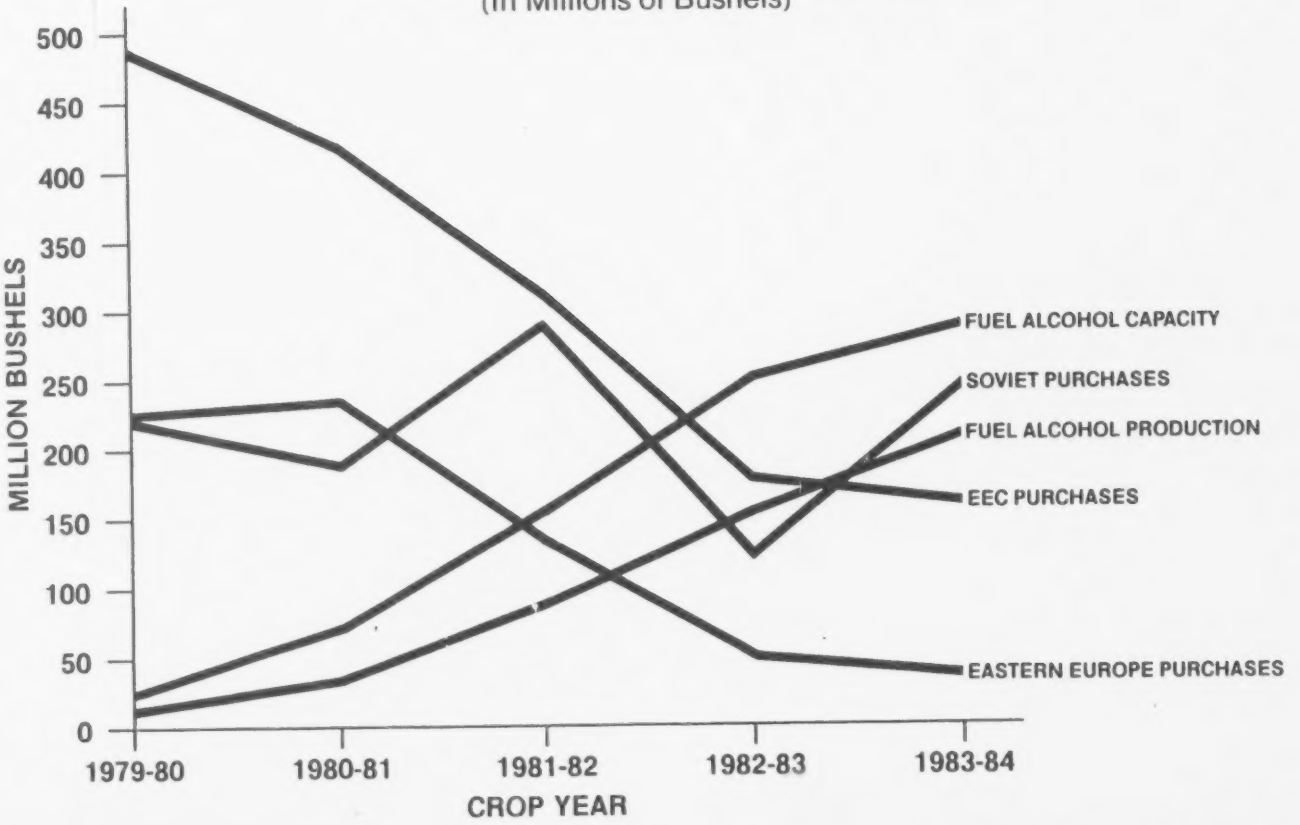
- If oil prices should rise considerably during an interruption, then ethanol may become economically competitive without subsidies. Even without disruption, the real price of oil is likely to rise in the late 1980s and 1990s just as the current tax-credit program is eliminated. Thus, ethanol will continue as a viable industry.

- The ethanol industry provides a net balance of payments benefit. These gains continue at least up to the 2

40-678 0 - 85 - 12

MARKET FOR U.S. CORN

(In Millions of Bushels)



Alcohol Information: Industry Estimates

Export Information: Sparks Commodities

Renewable FUELS

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David E. Hallberg
President/Chief Executive Officer

OFFICAL SUPPORTERS OF HR. 4105 & S. 1931

American Farm Bureau Federation

American Agriculture Movement, Inc.

Center for the Biology of Natural Systems

Congressional Black Caucus

Environmental Action

Environmental Defense Fund

Farmers Union

Friends of the Earth

Midwest Governors Conference
& Numerous Individual Governors and Mayors

National Agricultural Chemicals Association

National Association of State Departments of Agriculture

National Association of Wheat Growers

National Conference of State Legislators

National Corn Growers Association

National Farmers Organization

Natural Resources Defense Council

Northeast-Midwest Congressional Coalition Executive Committee

Oil, Chemical and Atomic Workers International Union

Sierra Club

Solar Lobby

The Fertilizer Institute

Women Involved in Farm Economics

Private Companies: Retail Gasoline, Oil Refining, Coal, Agriculture, Engineering

Renewable Fuels Association
[illegible]
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David E. Hallberg
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PROFESSIONAL AND EDUCATIONAL BACKGROUND

OF

DAVID E. HALLBERG

EDUCATION

The Johns Hopkins School of Advanced International Studies, Washington, D.C., Masters of Arts Degree in International Relations. Areas of specialization: International Law; International Economics; and American Foreign Policy. Passed both written and oral fluency exam in Spanish. (1975-1977)

Augustana College, Sioux Falls, South Dakota. Bachelor of Arts Degree. Major in Political Science, with minor specialization in Business Administration.

WORK EXPERIENCE

Legislative Assistant, The Honorable James Abourezk, United States Senate. (1977-78 Responsible for the Senator's legislative initiatives in the alternative energy and agricultural areas. Involved in the genesis of the alcohol fuels legislation, including the passage of the 4¢ exemption in the Energy Tax Act of 1978.

Administrative Assistant/Legislative Director, The Honorable Berkley Bedell, United States House of Representatives. Responsible for oversight and direction of the Congressman's legislative operation, as well as administration of Washington and field offices. Areas of specialization: Agriculture; Energy; Foreign Affairs; and Military/Strategic. Drafted HR 3905, (later Title II of the Energy Security Act). (1978-1980)

President/Chief Executive Officer of the Renewable Fuels Association, Washington, D.C. Conceptualized and founded the Association in January of 1981. The RFA Executive Committee consists of the following firms: Archer Daniels Midland; American Gasohol Refiners; A.E. Staley; E.F. Hutton; New Energy Corporation of Indiana; Publicker Industries, Inc.; and Texaco. Members of the Association span the entire spectrum of the industry, from large and small producers to equipment manufacturers to financial interests. The RFA also has a growing state representation, including such states as Virginia, North Dakota, Minnesota, Nebraska, and the like.

As president of the RFA, Mr. Hallberg's accomplishments include successfully organizing industry and Congressional opposition to Administration proposals to rescind USDA and DOE alcohol fuel loan guarantee authority; mounting a successful defense of the industry's tax incentives in the face of the Administration's proposed repeal of the 4¢ exemption for gasohol from the Federal excise tax on gasoline, the 40¢ blender tax credit, and the 10% energy investment tax credit; gaining Congressional support for the necessary qualifications for the "at risk rules" as they apply to limited partnerships that utilize the EITC; and providing the Congress with an access point for research and analysis of industry issues, including such developing issues as the USDA pilot CCC-to-ethanol program and the development of a Strategic Alcohol Fuel Reserve (SAFURE).

Additional services have included the organization of U.S. alcohol industry conferences in Chicago, Washington, and San Antonio, where the industry's first

"alcohol as an octane enhancer" conference was convened. Mr. Hallberg is widely regarded as the spokesman for the U.S. ethanol industry, and has testified before numerous Congressional committees and panels. He has published frequently, including his most recent article in Foreign Affairs (Summer, 1982), where he addressed the merits of increased high protein co-product (from alcohol production) exports to nations like the Soviet Union as one means of relieving the pressures of volatile world grain markets on American farmers.

Mr. SKEEN. Thank you very much, Dave. We will go on with the panel and then we will ask questions at the end of your statement. Representative Hoyt Pattison, we are glad to have you with us.

Mr. PATTISON. Thank you, Mr. Chairman.

I am Hoyt Pattison, a farmer and operator and also a tenant farmer. I am also a registered professional engineer and operate O.H. Pattison Engineering, a small consulting firm.

It would appear that looking back for the past 50 years, we have been engaged in a negative approach to agriculture products. In other words, we have paid on the part of the Federal Government, farmers not to produce. We have tried to hold down production, tried to not utilize perhaps the greatest natural resource that we have in this Nation.

Think what it would be like in our Nation today if we spent the time, money, and effort to figure out how to use farm production and industrial raw materials and what it would be like in our country economically if we had full-scale production, fence row to fence row, using farm materials in our Nation of agricultural products.

In other words, for every dollar paid for those raw farm production, we would multiply that seven times and increase economic activity throughout the whole Nation.

The increased tax revenues resulting from this would solve many of the problems in the Federal Government as far as the Federal deficit is concerned, and in State and local governments also.

One example of how this can be accomplished is making ethanol from grain, and we feel that this is real significant because of the support that this has received.

This is one area that perhaps all of the major farm organizations agree on, and that doesn't happen very often. We have the Farm Bureau in January 1984, they passed a policy statement that says that in the last part of it, the tax credit on ethanol blended motor fuel is necessary to develop this new energy source.

The tax credits in effect in many States should be consolidated into a single tax credit at the Federal level. We support legislation to make tax credit at the Federal level 9 cents for ethanol blended motor fuel, thus permitting the States to phase down their tax incentives.

The WIFE organization women involved in farm economics was formed in 1976, and they had the first gasohol caravan to Washington at that time. They were pioneers in this effort, and they support this, not only because they are concerned about farm economics, but because they are concerned about the national security of our Nation and our dependence on foreign oil and that this would decrease that dependence.

The American Agriculture Movement was formed in 1978 and in that period of time, they have promoted the use of grain for ethanol production perhaps more vocally and harder than any other of the farm organizations.

The Farmers' Union, likewise, in June 1984 at their annual meeting this year adopted a resolution advocating the use of grain for ethanol.

Then we have many individuals in our State and Nation who have worked on this. George Autry, for example, a farmer in Roo-

sevelt County, built the first working operating ethanol plant in our State.

Pioneers such as him have worked in this area all over the United States. So, support for this is great.

With the initiation of the lead phasedown increase or advancement, it becomes even more important, because of the octane enhancement value of ethanol; and it is a proven fact that gasoline with ethanol in it, when compared with gasoline with lead in it is far more healthful in our air environment than anything that we have at the present time.

It is absolutely necessary, as I have stated before the WIFE organization, that for national security purposes, we develop our own renewable—and I emphasize the word renewable—fuel sources in our Nation, liquid fuel sources.

Let's give you an example of how this works, how incentives make it work. Since 1980, here in New Mexico, we have served as a model for the United States because we have instituted the highest tax incentives in the Nation for inducing this industry to come to our State and develop this industry.

We have had people come here and invest their money, build ethanol plants, produce ethanol, people buy that and put it in the gasoline that is sold, and this gasoline has been high octane gasoline, premium gasoline and even regular gasoline has had ethanol put in it, and it has worked very well.

In this Nation, we have the possibility this year of having an 11 billion bushel grain crop. When you consider wheat, corn, grain sorghum, barley, and all of it, 11 billion bushels, one of the largest grain crops in the history of our Nation.

In 1983, we spent in our agricultural expenditures between $25 and $30 billion on agriculture programs, including PIK, to try to hold down the grain surplus. Gentlemen, it is almost an impossibility. That is not the way we want to go.

We don't want to hold down grain production. We want to increase it so that the whole Nation can benefit from, the advantages of this production.

Now, on the Federal level, if you gentlemen could persuade the rest of Congress to increase the tax incentives from 6 cents, and we appreciate the increase from 5 to 6 cents this year, but it needs to be up to 9 cents, so on the Federal level you will induce all over the Nation what has taken place here in New Mexico.

We have proven it can be done, and we have pioneered it. And it can be done all over the United States on a like basis. This would enable some States to come down on their incentives.

It is felt that perhaps 14 cents is a good level to level out at. That would mean the States would participate to about 5 cents, and keep this industry growing all over the United States.

If we utilize 65 percent of our normal surplus or, say, 1 billion bushels of grain each year, that would produce 2.5 billion gallons of gasoline and would make about 25 percent of all the gasoline sold in the United States ethanol blended at a 10-percent level.

Now, what would this do? Farmers could produce at will with little or no subsidies. Think of what that would do for the Federal budget; 20,000 full-time jobs would be created over and above any

construction jobs, and approximately 100,000 other jobs in associated industries and services.

Approximately 20 billion of nationwide increased economic activity would be generated, and at 9 cents per gallon, that tax incentive would only cost the Federal Government $1.25 billion.

Compare that with the $20 to $25 or $30 billion that PIK and other agricultural programs cost last year.

There would be decreased air pollution from automobile emissions. The U.S. foreign trade balance would be greatly improved because by doing this, we could decrease the imports of foreign oil 10 to 15 percent.

Our national security position would be enhanced because of that and the Federal tax revenues would increase greatly from all the increase in economic activity generated and the Federal deficit then will be decreased.

The problem is the highway trust fund. We have the same problem here in New Mexico. What will we do for our highways if we decrease their revenues to that extent?

The benefits therefore, are nationwide, so it would appear that reimbursement of the highway trust fund from the general fund would be in order from Agricultural Department appropriations. It would still be less than what they spend on PIK.

In the States, the general funds could reimburse their highway trust funds, but with the increase in Federal tax incentives could come down on theirs and alleviate some of the impact or as an alternative, we have in place presently in our tax laws a blender's tax credit, which allows 60 cents a gallon for every gallon of ethanol used in blending with gasoline to those who do the blending.

This tax credit could perhaps be used as an incentive to phase it in, increase use of it up to 90 cents a gallon, we advocate on the Federal level, while you decrease the impact of the gasoline tax incentive on the highway trust fund.

There are other alternatives that could be used, and we feel that your being here is an indication that you are interested in this. We appreciate very much the opportunity to visit with you and show you what we have done in New Mexico and this opportunity to tell you first hand, so that you may take this message back to Washington and make their grain to ethanol full scale agricultural production to liquid fuel effort truly a national effort.

Thank you for coming and listening.

[The prepared statement of Mr. Pattison follows:]

Mr. SKEEN. Thank you very much, Hoyt.

Let's begin the questioning now with Congressman Sensenbrenner.

Mr. SENSENBRENNER. Thank you very much, Congressman Skeen.

I have just got a couple of questions in the interest of time. First of all, I do support tax reductions for ethanol production and marketing. I think we have to recognize that one of the reasons the people don't buy ethanol based fuels is that they cost more than the regular fuels that are sold at the pump.

That is a decision that the consumer makes, and until we are able to get the price of ethanol based fuels competitive to the petroleum based fuels, I don't think we can expect to see a great increase in the percentage of the market for ethanol fuels.

Now, I do think the proposal that has been made for a single, unified Federal tax reduction or tax credit does have some merits to it.

However, I think we also have to recognize that since the Federal Government is running $180 billion deficit and since most States are running at a surplus getting that proposal through the Congress is easier said than done.

Now, if it is impossible to get that proposal through the Congress, how then are we going to be able to get more people to buy ethanol based fuels at the gas pump?

Mr. PATTISON. Congressman, we have demonstrated here in New Mexico that ethanol blended fuel can be sold at a less price than other fuels. We have demonstrated where the blenders or the gasoline jobbers have mixed it with regular gasoline because of our tax incentives, they have been able to sell it at a lesser price and this has caused some problem with the other marketers of gasoline who aren't able to get the ethanol.

So, the answer here is greater production and greater ethanol blended fuels, and they can be sold at a lesser price than premium gasoline, for example.

Mr. SENSENBRENNER. Well, the Texaco gas station that I buy my gas at in Alexandria, VA, had a gasohol pump up until about a year and a half ago, and pulled that out obviously because it didn't sell any gasohol.

Even with the tax credit, the gasohol was selling somewhere at 8 to 10 cents a gallon above regular unleaded fuel. It was about equal to the cost of premium unleaded fuel, and I still don't think we are going to solve the problem of low marketing of ethanol fuels until we answer that basic question.

The same question, I think, has been posed in a debate between leaded versus unleaded fuel. Unleaded fuel has always cost more than leaded fuel, and that has given people the incentives to carry out their catalytic conversions under the cars illegally, so they can put leaded gas in the tank.

Mr. HALLBERG. I would like to address that briefly. Congressman Durbin has introduced a piece of legislation which Congressman Skeen is also a prime sponsor of. There are different methods in trying to address the budgetary impact.

Congressman Durbin's proposal would be to tax leaded gasoline as opposed to unleaded at whatever level you would set it.

The numbers that we have seen on that proposal, if adopted, would pay for an increase in the Federal exemption to levels that are being talked about, and it seems to me that there are different combinations of those sorts of approaches if you, the Congress decided that the public policy benefits merited that.

So, I think there are different combinations of ways to achieve that.

Mr. SENSENBRENNER. I think that that makes it even more impossible for the Congress to pass a bill because if you give somebody else the benefit, you just add to the number of notables.

Thank you, Mr. Chairman.

Mr. SKEEN. Thank you very much, Congressman Sensenbrenner.

Congressman Durbin.

Mr. DURBIN. I would like to respond to the comments of my colleague first. It is interesting to me that since I introduced this legislation, the number of allies has been increasing by the day.

In fact, a week or two ago, the announcement by Mr. Ruckelshaus from EPA that the administration was going to take this on as a national campaign to bring down leaded gasoline usage in this country, I think, that the climate is now being set for the American people to start accepting the reality that when we went to unleaded gasoline and engines that used that type of fuel, that we were serious as a Nation that the day would come in our lifetime and in the very near future that leaded gasoline would not be a product of common and universal usage.

So, I think that perhaps the political climate is improving for the suggestion in my legislation. But along those lines, there is a very practical concern that I get in my district, and there are a number of people who own equipment, and perhaps Mr. Hallberg could address this, that use leaded gasoline, farm folks, for example, the heavy equipment that they use on the farm; people with motorcycles and gasoline and power lawn mowers and the like call me and say, what is going to happen?

I have got this perfect piece of equipment, and if I don't have leaded gasoline I can't make it run. Are you giving any thought, Mr. Hallberg, to a transition fuel here or whether or not we can start talking in terms of ethanol in some sort of modified form being a transitional fuel as we move away from leaded fuel to the unleaded usage universally in this country?

Mr. HALLBERG. I think the question of machinery that needs to use leaded gasoline is going to be addressed by the EPA calling for the 0.1 gram per leaded gallon standard until at least 1995.

That 0.1 grams has been shown to be enough to provide the lubricity for those vehicles that do need leaded gasoline so that they won't be damaged and that transition period over the next decade will allow those vehicles to be taken care of.

So I think that part has been taken care of. Whether or not you want to provide exemptions for agricultural equipment as the Congress has already done for other taxes will be very appropriate, but I don't think there are any technical problems there.

Mr. DURBIN. Thank you.

Mr. SKEEN. Thank you very much, Dick.

I would like to address a question here that is bothering me because we have already reached a contradictory stage in this part of the hearing and I think maybe we ought to go ahead and ask this question now, so that we have an opportunity for the following panels to respond.

There is an estimate that was given in the process of researching the background in this particular ethanol issue in New Mexico. There is an estimate that the current prices of ethanol are in the range of $1.65 per gallon in most States; however, in New Mexico, ethanol sells for the $2.20 to $2.30 range. Is this incorrect, or is this correct?

Give me the economics, then. Is our cost of production higher, or what does this estimate indicate?

Mr. PATTISON. The price of ethanol in New Mexico, as you stated, is correct. It is in the $2.20 to $2.30 range per gallon. The reason

for this pretty simply is our higher tax incentive than our neighboring States have.

Their tax incentives will now allow the recovery of the expenditure for ethanol at the rate it is purchased at here in New Mexico.

When you look at the direct price of gasoline, say, for example, 80 to 85 cents, then you add the ethanol incentive here in New Mexico, it is 11 cents plus 6 cents Federal; that is $1.70 a gallon.

You add that to 80 cents. That is $2.50 a gallon that the ethanol is worth, because they can pay that for it and then get it all back except the price of gasoline and the octane enhancement comes to them free.

If that was included, that would get it up to $2.75. You take the freight off, the jobbers' share, the blenders' share, and then the ethanol producer gets the $2.20.

Mr. SKEEN. Where does this put you, then, in the competitive spectrum?

Mr. PATTISON. We can produce ethanol in the same technology type plants as economically as they can in other areas with the exception that we don't grow as much grain, our freight sometimes is a little higher.

Mr. SKEEN. Neither one of you said very much about the byproducts of ethanol production, such as the stillage that we talked about.

I know that your focus has been on the alcohol production, however, I heard several proposals now for new plants in New Mexico that concentrate just on the stillage itself, which indicated to me that there is something in this marketing area such as either feeding or dairy processing or for human consumption, either.

Could either one of you comment on those possibilities?

Mr. HALLBERG. I think that is one of the exciting things about where we see the industry going. In just 5 short years, even despite the interference and changes in governmental policy, what have you, the industry has come to a departure point where the experts said that you couldn't feed the product, that there was no nutrient value in the product.

Now, it is in large demand domestically and abroad.

There is a premium over soybean value because of its high bypass characterization and there is more and more work being done all the time to further that. We do see food applications coming very soon.

There are people who see the different formulations of the rationale all the way from poultry to beef and dairy cattle some day making perhaps the ethanol a coproduct and the high protein coproduct remains material.

I think it is comparable to what soybeans did 20 or 30 years ago, where they finally value added it and broke it down into its components to develop a market for it.

So we expect that to develop very rapidly in the next 5 years.

Mr. SKEEN. Congressman Durbin has another question.

Mr. DURBIN. Mr. Hallberg, you are still confusing me here. I hope you can help me understand this with your perspective on a national basis. Is the average price of ethanol around the Nation about $1.65 a gallon?

Mr. HALLBERG. Yes, sir, Congressman. In fact, in some areas where there is large transportation and large consumer areas, the price is actually below $1.50. Now, my members are losing money at that price, and they are losing a lot of money, but the combination right now of PIK and the drought, we increased the farm prices and low gasoline prices, are forcing them to do that.

I would like to address that question, because it is an important one. Right now, the marketplace is cut in two. The major oil companies have chosen not to participate, but for the exception like Amoco in the Midwest, otherwise they are being beat up on the streets.

That means the independents are the only ones buying the product which cuts the gasoline market in half. Because of the balkanized State incentive there are basically 8 to 12 States where the product is forced in given the markets that are available and the transportation capabilities.

That means that it is a cannabilistic situation. My industry is cutting a penny and a penny and a penny, and it is down now to where, if you assume a combination or 80 cents Federal and State, which is conservative at $1.40 a gallon, that is 66 cents ethanol against gasoline for 80 cents.

Something is very wrong with that, since we have an octane value of 20 to 30 cents for gasoline.

So, that is one of the major impediments to the industry.

Mr. DURBIN. I understand, but the mechanism that we are talking about is a question of taxes. Our belief is, and perhaps you can comment on this, if you give a tax incentive to the industry, you will then reduce the unit cost of their sales of ethanol to the point where it is competitive.

Now, here in New Mexico, you have the best situation where, if I understand it, the 11-cent State tax break on top of the 5- or 6-cent Federal tax break, and yet the figures we are giving suggests that ethanol sells in this State even with the high tax rate at a price some 55 to 60 cents a gallon higher than it sells in other States of the Union.

Would you comment on that, Mr. Hallberg.

Mr. HALLBERG. I think that one of the elements Hoyt left out of his response is that there are different approaches to production.

I would quarrel with the statement that the production costs in New Mexico because of the scales of economy don't exist because the transportation requirements and what-have-you are as low as elsewhere.

I have known members that had the 100-million-gallon facilities that they built as a retrofit and the capital costs are far lower than our entrepreneurial grassroots costs.

Their production costs are far, far below what we can do here. I think it is a judgment call on the part of policymakers as to what your objectives are.

In this case, with New Mexico, its reindustrialization and I think you are getting your money's worth on that, but when you look at the national context, it is impossible to try to unifornize exactly how the price is going to come out because it is very sensitive.

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State of New Mexico
House of Representatives
OFFICE OF THE MINORITY FLOOR LEADER
THIRTY-SIXTH LEGISLATURE
Santa Fe

Testimony of Hoyt Pattison

Presented to the

United States House of Representatives

The Subcommittee on Investigation and Oversight
of the
Committee on Science and Technology and;

The Subcommittee on Wheat, Soybeans and Feed Grains
of the
Committee on Agriculture

At their hearing in Clovis, New Mexico
On August 14, 1984

My name is Hoyt Pattison. I am a farm owner and operator and a tenant farmer also. As a registered professional engineer, I own and operate O. H. Pattison Engineering, a small consulting firm.

In retrospect, it appears that for the past 50 years the Federal Government Agricultural programs in this nation have been a negative approach to solving a very large problem. The problem of surplus production capacity by agricultural grain producers. Over these many years with few exceptions, the approach has been to hold down production, to limit the, perhaps, greatest natural resource our nation has - our vast capacity to produce agricultural grains.

Imagine what would happen if we spent the time, effort and money necessary to figure out ways to use and to encourage the use of agricultural products as industrial raw materials and then had full scale production on our farms which was subsequently sold for profitable prices. We would have the greatest economic boom this country has ever known.

Full farm production, sold for prices yielding an equitable profit would yield seven times the dollar value of the raw farm production. Farmers would be buying farm machinery and equipment and production inputs such as fertilizer, feed, seed, pesticides, repairs, fuel, electricity and manufactured household items as well. Industry, both existing and new, would be utilizing these renewable raw materials to produce needed products such as industrial chemicals, building materials, liquid fuels and other forms of energy in addition to the food and fiber products now produced.

The increased tax revenues generated by all this increased economic activity would go far towards eliminating our present federal budget deficits, and state and local government revenues would increase also, without tax increases.

One example of how this can be accomplished is demonstrated by developments in the utilization of surplus agricultural grains for the production of ethyl alcohol and high protien food and feed products. This usage of surplus grains is one area where all of our major farm organizations are in apparent agreement. The American Farm Bureau, The Farmers Union, the American Agricultural Movement, the National Grange, the National Farmers Organization, Women Involved in Farm Economics, and many other farm and livestock producer organizations have demonstrated varying degrees of interest in this project.

In January of 1984 at their annual meeting, the American Farm Bureau Federation adopted the following bio mass fuel resolution:

"Alcohol from grain and other agricultural products can be an alternative energy source. We support the production of alcohol from grain and other agricultural products and urge industry and agricultural cooperatives to investigate and produce this fuel extender. We favor full research and development for the increased production of all forms of alcohol from agricultural resources for energy use.

The tax credit on ethanol blended motor fuel is necessary to develop this new energy source. The tax credits in effect in many states should be consolidated into a single tax credit at the federal level. We support legislation to make the tax credit at the federal level 9 cents for ethanol blended motor fuel, thus permiting the states to phase out the state tax incentives".

In 1976 when the Women Involved in Farm Economics (WIFE) was formed, they had the first gasohol caravan that went to Washington D.C. using alcohol fuel to bring public recognition that ethanol fuels could be effectively used to run motor vehicles. WIFE has been very much involved in the promotion and use of ethanol fuels and coproducts. WIFE feels that ethanol fuels production will promote energy independence from OPEC and promote the use of United States commodities. They are very enthusiastic and supportive of fuel alcohol and feel it is a vital energy source.

The American Agricultural Movement has been supporting alcohol fuel production since 1978. They were the organization that Congress used in testimony in 1979. The founder of AAM was Eugene Shroeder. The greatest concern in Congress was the argument that production of ethanol consumed more energy that it produced. Dr. Shroeder requested the Department of Energy to do an analysis on energy consumption to present to the House and Senate Conference Committee on the Windfall Profits Tax Act. The results showed that energy efficiency was no longer a viable argument against ethanol production. The American Agricultural Movement helped pioneer the industry by providing crucial information on BTU consumption. Over 50 agribusinessmen across the country testified regarding the on farm facilities in operation at the time and Dr. Eugene Shroeder's pilot project provided necessary demonstrations. These pioneers are still strong supporters of the industry.

In June of 1984 the Farmers Union adopted this statement: "We believe that federal and state agencies should encourage research and development of energy from renewable resources and waste including alcohol production from grain and other commodities. We further recommend that alcohol for fuel from farm products be tax exempt on both state and federal levels. We further recommend that the federal government make available to farmers and farm co-ops grants amd loans for the production of alcohol."

With the accelerated lead-in-gasoline phase down program, ethanol used as octane enhancement in gasoline blends will provide a much needed, more healthful alternative. It is a proven fact that ethanol blend in gasoline, for higher octane instead of lead, results in less air pollution from motor vehicle exhaust emissions.

The development of a large grain ethanol production industry in the United States is vital to our national security interests. Any increase in our capacity to produce ethanol for fuel from renewable resources lowers our dependence on imported oil and in turn lowers our vulnerability to being cut off from foreign oil supplies.

It is absolutely necessary for the security of our nation that we develop this large liquid fuel alternative.

Since 1980, New Mexico has served as a model for the nation in the production of ethanol from fermented grains. We believe our experience could be replicated across the nation to provide new jobs, reduce foreign oil imports, and absorb costly farm surpluses.

New Mexico has used an ethanol blended fuel exemption from its gasoline tax ($.11 per gallon) as an incentive for ethanol production. A similar exemption is feasible on the national level, where nationwide production could be encouraged by an increase in the ethanol blended fuel exemption from its present $.06 per gallon to a level of $.09 per gallon, with a permanent cap of $.10 per gallon to take effect should the overall gasoline tax rise.

Surplus grain should be used to produce ethanol. We now have a surplus of 2-3 billion bushels of corn and grain sorghum and 1 billion bushels of wheat. This is an accumulated surplus over what is needed domestically and what is now exported. This surplus would produce 10 billion gallons of ethanol, which would amount to 10 percent of the annual U.S. gasoline consumption (100 billion gallons per year).

If we utilized 65%, or 1 billion bushels, of the normal annual grain surplus, and converted it to ethanol, it would yield 2.5 billion gallons of ethanol, which would make 1/4 of the gasoline used in the U.S. ethanol-blended, and we could decrease our oil imports by 10-15%. This approach would produce the following additional results:

-- Farmers could produce at will, with little or no subsidies;

-- 20,000 full-time jobs would be created, over and above any construction jobs associated with plant construction. Also, there would be a great number of jobs generated (approximately 100,000) due to other economic activity in the communities where the plants were built, and in other parts of the nation;

-- Approximately $20 billion of nationwide increased economic activity would be generated;

-- At $.09 per gallon this tax incentive would cost the federal government $2.25 billion, compared to $25-$30 billion spent last year on the PIK program and other USDA programs.

-- There would be less air pollution from automobile emmissions;

-- The United States foreign trade balance would be greatly improved by less oil imports and more high protein food and feed exports;

-- The United States national security position would be greately improved;

-- Federal tax revenues would increase greatly from all the increase in economic activity;

-- The Federal deficit would be decreased.

The Highway Trust Fund could be reimbursed it's $2.25 billion loss from farm program appropriations to USDA.

As an alterntive, in order to alleviate the revenue loss to the Highway Trust Fund, Congress might consider expanding the use of the blenders income tax credit, making it apply to anyone who blends ethanol and to income from any source. An income tax credit of $.90 per gallon for every gallon of 200 proof ethanol blended with gasoline could be phased in as a replacement for the existing gasoline tax exemption.

The blenders income tax credit of $.60 per gallon is a part of the existing tax law and I suggest the expansion of its use. This would answer the objections of most of the people who object to the gasoline tax exemption because of its impact on highway construction and maintenance funds.

I appreciate the opportunity to appear before you and to give you this testimony. We also appreciate your coming to our area to visit with us and to see what we are doing here in New Mexico to advance the grain ethanol production industry.

Mr. DURBIN. Thank you.

Mr. SKEEN. Any further questions?

I want to thank you both very, very much for being here, and I hope that you can stay and if we have a question, we may want to ask later on, you will be available.

The second panel today is Mr. Charles Clark, president of the Ethanol Producers of New Mexico from Clovis; Mr. Joseph Bishop, president of Midwestern Co., Inc., accompanied by Mr. Eugene Mason, who is the chief counsel and executive vice president of the same company, from Joplin, MO.

Also on this panel is Mr. John Martz of the Mountain Development Corp. They have given you a lot of room to sit down there, so you can be very comfortable.

I want to welcome you all here, and thank you very much for consenting to being part of this panel on the information-gathering process; and we will begin with you, Mr. Clark.

STATEMENTS OF CHARLES A. CLARK, PRESIDENT, ETHANOL PRODUCERS OF NEW MEXICO, CLOVIS, NM; JOSEPH W. BISHOP, PRESIDENT, MIDWESTERN CO., INC., ACCOMPANIED BY EUGENE MASON, CHIEF COUNSEL AND EXECUTIVE VICE PRESIDENT, JOPLIN, MO; AND JOHN MARTZ, MOUNTAIN DEVELOPMENT CORP., PORTALES, NM

Mr. CLARK. Thank you, Congressman Skeen.

Mr. SKEEN. Once again, let me say that your prepared remarks in full will be entered in the record, and we would appreciate any other comments.

Mr. CLARK. If that was a hint to keep it short, Joe, thank you.

Thank you, Congressman Skeen, Congressman Durbin and Congressman Sensenbrenner and staff, and I would like to thank the others for their interest and basically on behalf of the Ethanol Producers of New Mexico, Inc., a newly formed organization, my name is Charles Clark, and I am president of that organization, which is dedicated to the future development and improvement of the ethanol industry in the State of New Mexico.

I thank you gentleman for giving me the opportunity to testify on behalf of our new industry, and I would probably have to refer in my notes for more than I would like to normally in the interest of time, so I will not ramble.

After spending a lifetime career in agribusiness, basically in the Midwest, and early life in the West out here in northern New Mexico and Colorado, I made a major vocational change over a year ago to enter the ethanol industry.

It took about 10 months of deliberation to make this decision and I had pioneered in several other areas of agribusiness and I guess I have a pioneering spirit to join this industry.

Being an agriculturalist, I am a long-term thinker, and I have spent the past several months in management in this industry and after doing so, I have become even more convinced that the ethanol produced from grain has the potential of being one of the most important scientific and economic breakthroughs to happen for the future of this Nation.

And at the risk of being possibly overdramatic, I would like to refer to the word "breakthrough" and say that sometimes only once in a lifetime does something happen. And I looked at the ethanol production from grains as being one of those things that we would look back on some of these days and say this was a breakthrough if, in fact, we see it through.

There is a possibility that due to the type of resistance, something like this will not be seen through, but I believe it will be, and I don't believe in the word "impossible."

And I would like to dwell just a minute on the word long-term thinking, versus short-term thinking, and address just quickly Congressman Sensenbrenner's statement or question, and a very real one, of the type of opposition due to many things, one of them being the international deficit.

But I would like to say that we don't have time to address it, but one of the big reasons, more than the deficit in this Nation today, is the lack of profitability of agriculture, which agriculture and small business are the basics of this Nation.

One of the basic reasons for this is that all wealth originates in the Sun and the soil and we have to stop and think about that. Due to the last 75 years of urbanization, most people don't realize that.

The long-term economic viability of this Nation and the world depend on how profitable the U.S. farmer and small businessmen are. If these people do not make the profits, of necessity there is no excess wealth to filter on up through the business economy and the business system for the population centers and the urban centers.

So, again, it is a question of long-term thinking versus short-term thinking and agriculturalists vary to be long-term thinking.

Where the public thinks only for today, and therefore, since usually governmental legislators have to basically please the public, it is difficult to oppose the short-term thinking of today.

The things that we are enjoying here today, we wouldn't have had it not been for a long-term thinking pioneer who had paid the price to stem the tide of the short-term thinking and that is the case with the ethanol industry today.

We are lulled right now to sleep. Where did the ethanol industry start? It started out of the seventies when we had an oil crisis. That oil crisis had been building for 50 years due to control that sprung loose.

We have an ethanol industry come from that and now that we are lulled to sleep, that there is not a crisis in oil and we have a surplus, this is when we should be working to build this industry.

So I would like to say that the ethanol from grain industry offers a new outlet for this surplus plagued basic state of our economy.

We need to address this in long-term thinking, and work hard while the Sun shines, because one of these days, oil prices will get high again, and you will need this alternative source of energy.

I believe that the newly emphasized lead phasedown in gasoline by the EPA will dramatically increase the demand for ethanol as a gasoline additive and due to the vast reserves of the fossil fuels in this country, I am not naive enough to think that the ethanol will replace gasoline in cars 100 percent.

Even in countries like Brazil, it is up to 70 percent and we won't, because the processes of obtaining gasoline from petroleum based

products is has the cost effect than ethanol, but that does not mean ethanol is not a great potential for octane enhancing and replacement of lead for health reasons.

To look at the industry not only in New Mexico, but at the national level and speaking from an association standpoint, I see and am witnessing a strong nucleus of dedicated producers mostly in New Mexico because, and on a national level, the people are looking, and they are investing the time and energy in gayly upgrading of the plant and the plant sufficiency and improving the design process and capitalizing on mistakes made by others as well as working toward alternate feedstocks and energy sources and progressively bringing the cost of production down for a long-term viable stable level.

And this is going to be necessarily in New Mexico. All these efforts cost time and money, the people that are involved in this on a day-to-day basis need time and they need money.

And this tax incentive is needed to buy both the time and money to develop this industry and there are other industries that have depended on tax incentives in the past and are still ongoing to develop these industries in their formative years.

Many of them cost a lot more than we are investing in the ethanol business. We have had oil depletion allowances in the oil and gas industry and the national synfuels program has invested many, many dollars, some of it coming into controversy of energy such as solar energy and others from grants and other research and development programs.

Many of these are ongoing today at much greater cost than the ethanol industry, and some of them are viable and others are not as viable as ethanol due to the fact that it is a renewable source and nondepleting source.

We have gotten into a developmental problem in the ethanol industry while we are dependent on a tax incentive to repay the heavy capital intensity of their business. We have run into a few problems.

One of the problems is that there were many unknowns in the ethanol business. One of the unknowns was how much money it takes to get a plant in operation and started. David Hallberg referred to these joint plants that have been in production for years.

I don't think he stated that many of these are byproduct plants. He did state that they were retrofitted plants that were already in existence.

Their plans for building these plants and also many of them are built around a byproduct of the foreign oil or foreign business and, therefore, they have marketed their ethanol as a byproduct not necessarily seeking the profit that is necessary to repay this intensive capital outlay.

Other things that happened where design of these plants especially in the New Mexico area and in some of the other areas and some of these are not producing today because there was not enough tax incentive to make them profitable in the areas and States that they were in.

This came out of an outgrowth of the design plant that was the large 20, 30, 40 million gallon plant or the onfarm small units that were developed out of the seventies and a combination of ideas and

combination of design and engineering that came out of that to get a viable commercial unit that would be cost effective and pay back its costs itself and, therefore, we have the 1-million-, 2-million-, and 3-million-gallon plants designed in this area.

Those plants cost a lot of money, and there was a lot of experimental operation as those plants came onstream and had to develop and are still in the stage of getting designs that are effective and getting the bugs out of it.

So, what happened during this time is we have had some casualties and failures along the way in other States and one major one that we will address here in New Mexico.

The biggest problem faced here in New Mexico and other States now in ethanol is the unfavorable climate of the public finance community.

This climate was not bad a year or two ago and now due to these casualties and if you will survey other businesses that have started up in the past, you will find similar types of casualties.

Much of the problems in New Mexico stems from an action that was taken on the incentives last November and December. The Governor came out and publicly discussed the plan of possibly reducing the taxes in November of 1983.

This was followed by the January session for where the legislative session in New Mexico also debated and discussed reducing incentives on ethanol.

This rippled through the press and out through the country and into the financial world and caused a lack of faith in the future of this industry on behalf of people who were going to put long-term financing behind operations.

This did have a great effect on the industry and it is having an effect today. I had an opportunity to witness this first time by watching Midwestern Companies run out of capital and shut down 60 percent of the production of ethanol in the State in May of 1984.

Part of the reason for the failure of this company was possibly a lack of proper planning, overexpansion, and mismanagement, but the company did have loans in place in January to finance these shortfalls in capital and after this bad publicity came out, these loans did dry up and the company did fail and ceased operations.

I have been asked today to address the facts as much as I can behind this company because it is a fact that people know about it that there are eight plants with 1-million-gallon capacity sitting east of Clovis that are not in operation and four plants east of Clovis with 1-million-gallon capacity that are not in operation today and I will try to go through this, but in order to hopefully clear up a few questions, we will discuss how Midwestern started.

There were a group of men coming from the Western States who started Rocky Mountain Development Co. in 1981 and in 1983 built a plant, a 1-million-gallon-sized plant east of Clovis and this plant was probably undercapitalized, from what I hear.

I was not here at the time. I came to New Mexico in July 1983, so some of these things I did not witness first hand. They are secondhand information. But this plant closed due to two factors.

One, it was an experimental design, like I said. Technology gathered from the size of the plants and due to the lack of enough capital to see it through and get it changed and retrofitted into profit-

ability was also a factor. I have heard that there were two other plants built by these people in two other States.

The company that was to pay them went bankrupt. That forced them into bankruptcy since they were not paid. Then the company named Western came from Missouri and joined with these men and these men owned a corporation known as Pipeline Engineering, I believe, and these people joined forces and Midwestern Companies had vast coal reserves and they were a public company newly formed.

They had gotten into the ethanol business and joined with these people with a plan for building some 10 to 12 plants of the million-gallon size in New Mexico.

They built some plants and I believe five plants were constructed with investor revenue bonds and there were three other plants built, I suppose without industrial revenue bonds.

Three plants in Roswell will be built with industrial revenue bonds and one of the plants that was built there was a purchase plant that was built by some entrepreneurs prior to that.

The plan of this company was to have a basic company developed and a secondary company which was a subsidiary and they purchased this from the men who built the plant of Rocky Mountain Development.

They used that division as a construction arm. The plan was to then sell these plants to general and limited partners throughout the United States, each individual and separate, and the reason for the size of this plant and the reason for it being sold separately was the instrumental financing.

They were to share common support facilities such as stillage and byproduct handling and some energy sources.

This plan was followed through which sold them to limited partners, to brokerage firms across the country, and they formed a separate management company known as Process Management Co. Inc., and that management company was required by law to be a separate company and they managed to find a contractual arrangement with the plant owners.

To finance the building of these plants the Midwestern Companies came to the city of Clovis and in August of 1982 obtained industrial bonds for the plants somewhat in excess of $1 million per plant.

They also moved to Rosswell City and did the same thing on three of those plants. During that time the company showed a very strong financial strength with their coal reserves in Missouri and Kansas under the statement and the public statement looked good. It was good.

It was sound and they got good ratings on the bonds and new bonds sold very rapidly in the investment community and these bonds—by the way, many people misconstrue it and, like I say, here the industrial revenue bond for anyone who does not know are bonds that are sold through investors and they are not to be confused with municipal bonds where the city or municipality is responsible for paying them.

If those bonds failed then the people throughout the United States who invested in these bonds would be the losers. The compa-

ny then, after building those plants, did some other expansion and requisitions that caused their stock to really soar as we know it.

One of the most rapidly growing stocks on record in 1983, Midwestern Chemical stock went from something like about $7 to $24 in a short period of time.

During that period of time in 1983 some problems started developing with the operation here and the original Rocky Mountain development split off from the others and after a series of management changes in July 1983, or I will say August 1983, there were several problems with getting the plants to operate at capacity.

Again, due to this experimental design which plagued everyone's plant, anyone with a local plant will tell you that they had to do a lot of changing that took a lot of capital. In the case of Midwestern there were problems.

It was probably too rapid an expansion, but they had to pump a lot of capital into these plants to get them into the operational mode that they were designed to produce and change out some of this mistakes in design.

Due to this operating at a loss for a period of time and the amount of money pumped in, it took until January 1984 before these plants were in the black. The plants were operating in the black and at that time the Western Co. was concentrating their efforts and their capital on constructing 12 new plants in Louisiana and they started running out of capital in December for both the operations and due to, again, improper planning and some unexpected retrofitting, this rain on capital would be replaced according to the management of the company by a $10 million loan which was supposedly committed in January and also a $19 million stock placement that was reportedly done in January.

I am sure there was some lack of faith on internal management due to lack of capital and shortfall in bill paying, but there was a lot of bad publicity that stemmed from the discussions in Santa Fe at that time along with other investigations and bad publicity and these loans were denied and the money source dried up.

This caused Midwestern Co. to not go into chapter 11 at that time, but to basically cease operations. Then Process Management Co. was not a subsidiary directly, but it was in its infancy and being funded by Midwestern and those funds that funded PMCI also dried up and due to some contractual disputes with the marketer and the basic company, Midwestern PMCI's capital was drained and they ceased to operate in May 1984.

I hope that clears up some of the questions as to how they originated and how they went down. And the bright side of this is speaking from an industry standpoint I see these things happening.

The basic financing method of the Midwestern Co. operations was not long in most people's opinion. There will be other operations financed in the same way.

There will be operations sold as general partnerships and there will be operations financed with bonds we hope and we hope to see a restored faith in the financial community because the new people that are going in the 20th have learned by the mistakes of others.

They are seeing the need for design changes. They are seeing the need for insurance to cover the lack of performance on engineering, insurance to cover and performance bonds in all phases and if

you will investigate the newly set up packages coming down the pike today you will see all these safeguards being put in place, plus you will see a requirement by the financial community that did not have a president earlier on and finance some casualties they have put in safeguards and requirements in their loans and in their bonding programs that look like and are designed to prevent some of these casualties from happening or to cover them in case they do.

The one thing that is a must to understand is that there is a long startup time required in these plants. It is something that most people did not understand. They would put a 60-day capitalization behind it. Sometimes it takes 6 months to 1 year in larger plants to get them to get the bugs out of them and go through startup.

Therefore, the new financing people are covering this with requirements of upfront operating capital in place and requirements of no capital being pulled out.

To go on, I can say that no new industry can survive a particular commitment on behalf of the State and national legislators. If we go through and continue to hassle on incentives being pulled after they are put in place, it will destroy the faith of the financial communities on the possibility of getting paid back on the investment in their loan.

The fact of all the action basically was in New Mexico. I wouldn't say all the action. There is some action in some of the other States and there are some plants built in other areas, but basically most of the actions in New Mexico and this proves that we need the amount of incentives that these legislators have so wisely put together back in 1981 and 1982 to capitalize this industry.

We have put them in the phasedown so that it can be phased down in time after the initial startup is financed.

The second problem that has entered this industry that I would like to allude to is the learning curve working with various regulation industries such as environmental improvement, but I would like to say to a very broadminded group of people, both in the producer's sector and the regulatory sector, we have a tremendously good rapport with the tax and revenue department with the New Mexico State regulators and New Mexico University and then between Environmental Improvement Division which started out to be possibly a bad scene.

We have had a series of meetings with the environmental people from Santa Fe who have come to the plant and seen the operations and the problems and have formed a technical task force to work with the industry to work out solutions. So we are rapidly progressing to get these problems behind us.

In summary, I feel that one of our major concerns at both the State and national level would be the full brunt of our tax incentive is borne by the highway departments both in New Mexico State, other States, and the Nation.

While the long-term economic benefits for the growth of their industry are benefiting all sectors of the economy, therefore, I think we should concentrate on a joint effort between industry members and legislators to find a way to finance the tax incentive from general funds both on the national and the State level.

Also, I think we need to have more and more replacement of State incentives on behalf of the national and I think the Nation needs to start recognizing that ethanol is part of our overall energy development future and treat it as such like others have been treated.

I would like to make another opinion in closing that this is not a special interest group. The ethanol production in this country should not be viewed as a subsidized special interest the segment like many other tax drains that we see.

Rather than that, it is an investment of our tax dollars that long term will benefit any tax. Any tax supported industry is going to come under scrutiny and criticism by those who have to pay. It is going to take some revenues and funds from some other group. In this case, we have already pointed out who that is.

Also, we might want to say that this should be opposed by the oil companies and gasoline industries, its competition and I don't think we should look at it this way. I think the funding of this needs to be worked out together with these people and I think that we need to work as allies instead of enemies for a common goal of solving our energy problems and I say it can be done.

[The prepared statement of Mr. Clark follows:]

TESTIMONY

Congressional
Hearing, 8-14-84
Charles A. Clark

After spending my life career in agriculture and agribusiness, I made a major vocation change over a year ago to enter the ethanol industry. It took ten months of deliberation to make this decision. Being an agriculturist, I am a long term thinker.

Having spent this past several months in management in this industry, I have become even more convinced that ethanol produced from grains has the potential of being one of the most important scientific and economic breakthroughs to happen to the future of this nation.

One of the basic reasons for this is that all wealth originates from the soil and the sun. The long term economic viability of the nation and the world depends on how profitable the U.S. farmer and small business man are. If these base people do not make a profit above bare necessities, there is no excess wealth to multiply up through the business system to the urban population centers.

The ethanol from grain industry offers a new outlet for this surplus plagued basic segment of our economy.

I believe the newly emphasized lead phasedown in gasoline by the E.P.A. increases the demand for ethanol as a gasoline additive. Due to the vast reserves of fossil fuels in the world, and their less expensive processes, I don't see ethanol replacing gasoline in U.S. cars 100%, but I see a great potential for octane enhancing and lead replacement for health reasons.

Speaking to the progress of the industry, I am witnessing a strong nucleus of dedicated producers who are investing their time, capital, and energy in daily upgrading of plant effeciency, improving design and processes, as well as working toward alternative feed stocks, and alternate sources of energy to progressively bring the cost of production toward a long term viable stable level.

All these efforts cost money and time. That is why we must maintain our tax incentives at this level until the industry develops enough to become self supporting. Other industries in this country have been and are being aided through their formative years. Many of them at staggering costs to the taxpayer compared to the relatively low price we are paying to develop the ethanol industry. Examples are the oil depletion allowance which has been in effect for many years to aid further development of the oil and gas industry. Also the national synfuels program which has come under some criticism recently, is getting big tax dollars for various grants and research and development programs.

One of the biggest problems that the ethanol industry is facing today is an unfavorable climate in the public finance community.

Much of this problem in New Mexico and the nation, stems from the action started last November in Santa Fe when the governor started talking of reducing the tax incentive.

This was followed in January by the legislature threatening it all through the 1984 session. After this rippled through the press, it shook the faith of the investing public.

I had the opportunity to witness this first hand by watching the Midwestern Companies run out of capital and shut down 60% of the ethanol production in the state in May of this year. Part of the reason for this failure may be attributed to overexpansion and mismanagement, but the company had a ten million dollar loan committed in January, and they were working on a 19 million dollar stock placement. At that time the plants were operating in the black and were on the verge of making it; but the loan commitments were canceled due to the bad publicity and the company failed and ceased operation.

No new industry can survive this type of fickle commitment on behalf of state or national legislators.

The fact that all the action is in New Mexico, proved that we need the amount of incentive that this state has so wisely inacted to attract capital and build the industry.

The second problem that has hindered the industry is the learning curve of working with the environmental improvemen division, but through a mutual cooperative effort and a series of joint meetings, the EID has formed a technical assistance group to aid the ethanol producers in obtaining permits to discharge effluent. This effort has resulted in great progress toward putting these problems behind us.

In summary I feel that one of our major concerns on both the state and national level is that the full brunt of the tax incentive is born by the highway departments, while the long term economic benefits of the growth of this industry will benefit all sectors of the economy. Therefore; we should concentrate an offensive as a joint effort of industry members and legislators to find a way to finance the tax incentive from general funds.

BIOGRAPHY

CHARLES A. CLARK
101 E. Chanticleer
Clovis, New Mexico 88101
505-763-4322 (Home)
505-763-3140 (Office)

EDUCATION

1958 — Graduated from Southwest Missouri State University, Springfield, MO. with B.S. Degree in Agriculture. President: Agriculture Club and Tau Kappa Epsilon, Social Fraternity.

Attended High Schools in Colorado, Kansas, New Mexico and Missouri.

Credits:
Dale Carnagie Human Relations Course, 1964
Instructor: A.I.B. Course, "Agriculture Lending", 1975
Graduated: National Commercial Lending School, American Bankers Association, 1974.
Completed: A.I.B. Course "Analyzing Financial Statements:, 1975.
Completed: A.I.B. Course, "Financial Cash Flow Analysis",1976.
Three years High School Vocational Agriculture (FFA).

EXPERIENCE

July 1, 1983 to present — CHIEF OPERATING OFFICER, Process Management Company, Inc., P.O. Box 1326, Clovis, New Mexico, 88101. Manage twelve million annual gallons of ethanol production, Clovis and Roswell, New Mexico. $50 million dollar annual revenue and 150 employees.

August 1, '82 to June 30, '83 — Financial Consultant, Shearson American Express, P.O. Box 640 Joplin, Missouri. Commodity and Stock Broker.

July 1, '79 to July 30 ' 82 — COMMODITY BROKER, BRANCH MANAGER, Peavey Company, Joplin Stockyards, Joplin, Missouri. $375,000.00 plus, gross business annual. Did extensive hedge training and management with farmers.

Jan. 26, '79 to July 1, '79 — COMMODITY AND STOCK BROKER (Investment Executive) Shearson Hayden and Stone, Inc. 108 W 4th, Joplin, Missouri.

March '77 to Jan. 26, '79 — COMMODITY AND STOCK BROKER (Account Executive) Reinholdt and Gardner, Inc. 108 W. 4th., Joplin, Missouri.

Jan. 1, '72 to March '77 — VICE PRESIDENT AND AGRICULTURE LOAN OFFICER, First National Bank and Trust Company of Joplin, Missouri. Started and headed up Agriculture lending department.

EXPERIENCE, CONT.

1963 thru 1971	DISTRICT SALES MANAGER, Ralston Purina Company, Lived at Lamar, Missouri, traveled Southwest Missouri. Responsible for sales of Feed and Animal Health Products through a dealer organization of 26 dealers. Achieved top tonnage salesman in Midwestern Division.
1959 thru 1962	DISTRICT SALES REPRESENTATIVE for Olin Mathieson Chemical Corporation. Lived in Springfield, Missouri, traveled Southwest Missouri. Responsible for sales of Fertilizer and Farm Chemicals through a dealer organization. Achieved top tonnage salesman in Missouri - Kansas area.
1958 thru 1959	United States Marine Corps. Active Duty, San Diego Calif. Honorable Discharge.

PAST AFFILIATIONS: Trustee: Board of Trustees, Missouri Bankers Association, Basic School of Agriculture Banking (On Founding Committee).

Member: Agriculture Committee, Missouri Chamber of Commerce.
Chairman: Agriculture Committee, Joplin Chamber of Commerce.
Chairman: Agriculture Committee, Joplin Rotary Club.
Member: Jasper County Farm Bureau.
Member: Board of Directors O.P.G. Chapter American Institute of Banking.
Member: Missouri Cattleman's Association
Member: National Cattleman's Association
Member: Young Farmers Association, Carl Junction, Mo.
Advisor: Carl Junction Vocational Agriculture Department Carl Junction High School, Carl Junction, Mo.

PRESENT AFFILIATIONS:

President: Ethanol Producers of New Mexico Inc.
Deacon: First Baptist Church, Carl Junction, Missouri
Liscensed: Missouri Real Estate Broker
Liscensed: Oklahoma Real Estate Broker

PERSONAL: Raised on farms and ranches in Kansas, New Mexico, Colorado, Missouri and Texas. (Father managed large farms and ranches.)

Mr. SKEEN. Thank you very much, Mr. Clark.

Mr. Bishop, accompanied by Mr. Mason.

Mr. BISHOP. Thank you, Mr. Chairman. I would like to refer to my printed remarks because I believe what is written here is important.

I live in Dallas, TX, and I am the new president and chief executive officer of the Midwestern Cos., Inc., with headquarters in Joplin, MO.

Our company through subsidiaries constructed 11 ethanol plants in Clovis and Roswell, NM. The plants operated for only a short period of time before being shut down earlier this year.

On May 23, our subsidiary, Titan Energy Engineering, Inc., a New Mexico corporation, and Titan Energy, Inc., a Louisiana corporation, filed for protection under chapter 11 of the Federal Bankruptcy Code. On the following day the parent company took a similar action.

These steps, although painful and unpleasant, were necessary because Midwestern and its subsidiaries suffered difficulties in cash flow, financial auditing, management, and controls. The Securities and Exchange Commission, the Internal Revenue Service, and certain New Mexico State agencies are presently conducting investigations concerning prior transactions involving the company and its subsidiaries.

Let me make it clear that new management of this company is cooperating fully with all of these regulatory bodies. At the same time, we are working diligently in an effort to restore cash flow and profitability to the company and its New Mexico subsidiaries.

Before addressing the national concerns of this distinguished committee, I would like to take a few minutes to review the present situation on a more local level as it relates to Midwestern and Titan and especially our industrial revenue bonds.

This is a matter of real personal pocketbook interest to a great many. I am confident that at this hearing today we have creditors, suppliers, and investors whose financial interests depend on the resolution of our company's difficulties.

First of all, I want to impress on this committee and other interested citizens that the Midwestern Cos. now has a completely new management for whom I am privileged to speak. I urge you to look at those individuals who have joined the board of our company.

Each has a proven record of success, and all of us are determined to redirect the course of the Midwestern Cos., Inc., and make this business enterprise successful.

Gene Mason is the board's vice chairman and is executive vice president of the company and is seated here on my left. A partner in Philadelphia legal firm of Stassen, Kostos & Mason, he no longer practices law on a daily basis.

Gene Mason has an outstanding and successful record in solving unique corporate financial problems, both in the United States and internationally. Other new members of the board include Calvin R. Guest of Bryan. Mr. Guest is a successful businessman in the area of financial institutions such as the area of Federal savings and loans and the banking industry. He has excessive holdings in oil and gas in the State of Texas and also ranching.

Mr. William S. Conley is of Dallas, TX. He is a man who is in computer financing and also has extensive holdings in Puerto Rico and also areas outside of the United States.

Mr. Michael Walsh is the executive vice president of Sunbelt Financial Institution. Mr. Patrick Nugent of Austin, TX is a businessman and serves on numerous bank boards and is also an independent businessman.

Mr. Robert Scott is a CPA from Pacos, TX. He has two bank-holding companies and is managing partner of his own CPA firm.

Mr. Jerry E. Wells of Joplin, MO, is a practicing attorney out of Joplin. Mr. Eugene Beckman is from California, and is also a practicing attorney from California.

Let me make it very clear that we, the company's new management and board of directors, are independent of and have no prior business relationships with the former management, board of directors, and various insiders associated with The Midwestern Cos. As of July 12 all of the former board of directors and insiders have resigned from the board.

Speaking for this new management, I sincerely wish that I could offer comfort to those creditors, investors, former employees, and other interested citizens of New Mexico who are so keenly and personally interested in our company and its destiny. All that I can say to you is that new management of the company is doing its best through hard work and financial creativity.

We promise nothing, but I would like to assure you of our deep concern for each of you and to outline our goals for the company and for the New Mexico business environment in which we will be operating.

We want creditors to be paid the maximum amounts available to them and to be paid at the earliest possible date. We hope that investors can realize a benefit from their investment in Midwestern, particularly those who purchased industrial revenue bonds.

We are working to put our former employees back on the payroll, and we want grain growers and other New Mexico businessmen to rely on us as a dependable source of revenue in the future.

These goals are ambitious for a reorganizing company. Are they achievable? We would not be involved with these problems and opportunities of we did not believe the goals of this reorganizing company could not be attained.

However, they can be achieved only through the cooperation of everyone involved. Only with all of us working together can the new management of Midwestern achieve stability for the company and place the ethanol plants in New Mexico and Louisiana back into operation prudently and profitably.

Only then can creditors, investors, suppliers, employees, and others concerned with this business enterprise realize their hopes and dreams. We ask for your patience and your understanding.

Let me review briefly the background of Midwestern's operations in New Mexico and give you some facts about our plans as they stand today.

We constructed and sold 11 fuel alcohol, or ethanol, plants near Clovis and Roswell during 1982 and 1983.

Plants were sold to partnerships which made a downpayment of 20 to 25 percent of the purchase price. Buyers would then enter

into a management contract with Process Management Co., Inc. of New Mexico to manage and operate the plant. Such management was to include marketing and sale of the ethanol and stillage products.

These plants were built and placed in operation, and resulting products were sold. However, as a result of cash flow problems, the plants were shut down for lack of working capital.

In addition, these plants proved to be an unreliable and erratic source of stillage products to the agricultural and animal-feeding marketplace and found only limited acceptance. It is important, however, for me to report to this committee and those interested citizens present that demand existed for ethanol produced by the plants and that sales revenues were realized from some plants.

We are convinced that demand for ethanol will continue strong in New Mexico and throughout the Nation; an adequate and economical supply of grain is available to ethanol producers in this State and elsewhere.

Operations at our New Mexico plants ceased this spring and Titan subsidiaries were voluntarily placed in chapter 11 proceedings, followed by the parent company itself. Today the plants stand idle—in various stages of operating capability. Accounts payable for the project amount to millions of dollars, and all loans are generally in default.

New management of the Midwestern Cos. proposes to arrange debt equity financing of some $3 million to rehabilitate the Clovis and Roswell ethanol plants and make them operational. Included in that amount are necessary funds for working capital. This capital infusion is not a normal bankable transaction because of past problems and the absence of reliable industry track records.

We, however, believe the capital needed represents a reasonable and businesslike risk opportunity which we are offering to investors/lenders. These funds will enable Midwestern to put the 12 New Mexico plants back in operation, get employees back on the payroll and being repaying creditors and holders of industrial revenue bonds.

We feel a special responsibility to these citizens and financial institutions who sought to finance the industrial growth of their State through the IRB method.

With ethanol tax incentives held at least at today's rates, putting these plants back onstream will both stimulate local economies and give investors the opportunity to realize a return.

Let me thank the committee and those attending these hearings for this opportunity to address my company's problems as they relate to the local communities, their businessmen and investors, and to review those solutions we are presently contemplating. I would now like to make a brief statement concerning the opinion of the Midwestern Cos. on the ethanol industry and its potential impact on the State of New Mexico.

The use of ethanol in motor vehicles is neither a new technology nor a new concept. Extensive literature on the subject dates to the earliest days of marketing and fueling automobiles. Racing cards have traditionally been powered by alcohol—usually mixed with even more exotic fuels. It was in the 1970's that the gasohol indus-

try was born, however, in response to shortages of gasoline throughout the Nation.

Gasoline, blended using ethanol, was marketed for the first time at the retail level in June 1978. In that first year the Nation's motorists used only 400 million gallons of ethanol-enhanced fuel amid flurries of great publicity and acclaim.

The publicity and acclaim have diminished, but the fact remains that during the past year some 4 billion gallons of ethanol-enhanced fuel were used by American motorists—10 times the amount of 1978. This represented 400 million gallons of fuel alcohol, ethanol, that were produced and added to gasoline at a 1-to-10 ratio to increase octane—or 4 percent of America's total gasoline needs.

This committee is well aware that the U.S. Environmental Protection Agency on July 30, 1984, tightened regulations on the amount of lead allowed in gasoline. Maximum lead content must be reduced 91 percent by January 1, 1986. The agency said it was considering a total ban on lead in gasoline starting in 1995.

But what does this mean for the ethanol industry in New Mexico? As Congressman Skeen has stated, this industry will "provide a magnificant source of income for New Mexico farmers," who can get market prices for their grain and can have a steady market for their products.

First of all, ethanol has demonstrated its ability to provide the necessary octane boosts for which refiners and gasoline blenders have traditionally relied on lead. With the evidence now called overwhelming that lead in gasoline is a serious threat to human health, ethanol will become even more important in the manufacture of high octane motor fuels.

There is a demand for ethanol. Economical production of it is a viable industry. Ethanol production also presents a unique opportunity for agriculture, both in New Mexico and through America's Great Plains breadbasket, transforming what could be a surplus into a valuable fuel product.

Although foreign oil and its effect on America's import balances are not the great concern they were some years ago, it should still be considered important by this committee. The fact of the matter is that larger amounts of crude oil are needed to produce unleaded fuel with a comparable octane level.

With America's oilfields now pumping and flowing at maximum capacity as they have for over a decade, only foreign sources offer additional crude needed to boost octane ratings.

Except for domestically produced ethanol. This product serves as a friend to farmers, a provider of jobs and economic growth, a contributor to a cleaner environment and a bulwark to national security.

We agree with Congressman Skeen as he was quoted in last Monday's Clovis News Journal that "ethanol offers many advantages as an alternative fuel source. By supporting the increased use of a fuel that doesn't deplete our oil reserves, we also recognize savings from costly farm price support programs and increased tax revenues paid by this growing industry."

Numerous tax incentives have stemmed from both the agricultural and environmental advantages of ethanol. New Mexico pro-

vides a tax incentive of 11 cents per gallon for ethanol produced in the State using grain at least 50 percent of which was grown in New Mexico. The Federal tax incentive is currently 4 cents, but legislation has been introduced to raise this amount. More than 30 other States also offer ethanol fuel tax exemptions.

If I could leave you, Congressman Skeen, and your committee and its nationwide audience with but one thought, it would be the importance of these incentives. I know that for my own company they are vital. I can only assume that others find them equally as important.

Therefore, I urge that this committee recommend that such incentives be increased. And, I make the same request to any State regulatory lawmakers or authorities who listen to or read these proceedings.

The environment of our Nation, America's agricultural economy, our international balance of payments * * * all of these benefit from the incentives offered producers of ethanol. And, this does not take into consideration the thousands of jobs provided by this growing industry.

Such demonstrated success of the ethanol industry in less than a decade offers an excellent example of the American free enterprise system in action—Government, agriculture, and industry working together for the mutual benefit of all of us.

On behalf of the Midwestern Cos., Inc., I want to thank Congressman Skeen, all the other members of this distinguished committee and the U.S. House of Representatives for this opportunity to present our views.

And, to representatives of the local community I pledge that new management of the Midwestern Cos. is doing its best and doing it both aggressively and prudently.

Mr. SKEEN. Thank you, Mr. Bishop.

We would like now to hear from Mr. Martz from the Mountain Development Corp.

Mr. MARTZ. Thank you, Congressman.

We at the Mountain Development Corp. are new. I don't think we could call any of the alcohol producers anything other than new.

We began in 1981 in the feasibility study. In 1982 we were in the planning stages.

We did not begin construction of our facility until May of last year. We went into production in December of last year which means we have barely over half a year of a production record. Our second plant began production in February of this year.

We began production of our third plant only last week. So we have three plants in production with really just barely over half a year of production.

To give you an idea of the impact that that is having, our three plants currently in production are using 4,800 bushels of grain per day. That is New Mexico produced grain.

That will have an impact on the agricultural community of eastern Mexico of $4.3 million during this next year.

Our future planning is for two more plants to be completed by the end of this year. That impact for next year will be $14 million

in agricultural products from New Mexico which would be consumed.

Now, I have mentioned New Mexico but we can't help but have an influence on availability of price and the price of all the grains around us in other States by what we consume here.

To give you an idea of the impact on the community where we are located, Portales is a community of 12,000 people. We are presently employing 57.

The payroll for those 57 people is nearly $600,000 for this year. By the end of this year we will have 96 employees, all from the Portales, Clovis area and our impact from payroll will be over $1 million per year.

By the time we have completed our project which presently calls for eight plants, we will be employing 144 people and our payroll will be aproximately $2,400,000 per year.

We have had an additional impact in the community of Portales of $1,900,000 in goods and services and contracts purchased out of that community. So these moneys that I have mentioned really are only direct expenditures of our corporation and doesn't really represent the money as it moves through the community.

To give you an idea of the future plans of our corporation, we are presently beginning construction on what we call a trash burner. We will be burning municipal waste from Clovis and Portales to produce steam.

This steam will be let down through an electrical generator which will produce enough electricity to completely power our facility and we will have a surplus of electricity which can be sold to local utilities.

The waste of this system will be used for drying our distillage grains. We are also planning three more plants which I have already mentioned which would bring our total plants to eight.

In addition, we are planning and will begin construction this fall on a food-drying facility, which will be taken to distillers of grains and drying and producing from them a human-consumable flour which will be available for sale in a domestic and in foreign markets.

I should mention that in these infancy stages the amounts of research and development, the expenses involved here are tremendous and we are dependent on the incentives that are provided by the State and Federal Government in order for us to be viable during this period of infancy.

During this period of infancy, it becomes the responsibility of each entity within the alcohol-producing community to establish their own viability for the time that these incentives are available.

I have mentioned the impact of our company on the local community. We are having an impact also on the national community in that we are purchasing millions of dollars in major equipment which comes from outside the New Mexico area.

These major equipment purchases are of short-term benefit only from the standpoint of the purchase of the long-term benefit from the standpoint of the maintenance and the services which must be purchased as long as our facility remains to be in production.

One of the major thrusts of our corporation is to produce a food grade flour for human consumption which can be sold in both do-

mestic and foreign markets. We believe that this is a major consideration or should be a major consideration of all those companies investigating the possibility of entering into alcohol production.

If other companies such as ours go into this food grain production of flour, it will become an impact which will have international effect. Our contribution to such an effort will be 125 million pounds a year of food grain human consumable product.

The benefits from that would only be beneficial to the balance of trade which would cause concern. So I guess the emphasis that I would make here is that considering the beneficial impacts that our industry can have in agricultural and local economies and the national economy, the potential that it has for balancing the problem with imported oil, the environmental concerns which have been expressed by other people, the potential for concentrating protein and partially alleviating the hunger situation in the world and the potential for the balance in trade, our feeling is that local and national governments would be wise to, at a minimum, maintain the current incentives, if not increase those incentives.

Thank you.

[The prepared statement of Mr. Martz follows:]

MOUNTAIN DEVELOPMENT CORPORATION

Present And Future Aspects Of The Ethanol Industry

Presented To

U.S. House Of Representatives
Committee On Science And Technology

August 14, 1984

Mountain Development Corporation's ethanol project in Portales, New Mexico began as a feasibility study in 1981. The summer of 1982, the project was in the design stage. Construction of the first plant began in May of that same year. The design capacity of the first plant was 4,400 gallons per day or 1,400,000 gallons per year. The second Mountain Development plant began construction in November of 1983 and went into production in February of 1984. The Corporation presently has three plants operational and two under construction.

The three Mountain Development plants currently operating are using 4,800 bushels per day of New Mexico produced grain. This grain consumption has an annual economic impact on the agricultural community of $4,380,000. By the end of 1984, the five plants that Mountain Development will have operational will have an annual impact on the agricultural community of $14,016,000 and will represent a 3,840,000 bushel per year market for New Mexico produced grains.

Mountain Development is currently employing 57 people from the Portales/Clovis area. This employment represents a monthly impact of $47,800 in payroll or an annual impact of $573,600. By the end of 1984, the number of employees will increase to 96 and will represent $1,064,000 in annual income to local citizens.

Future plans of the Mountain Development project include:

-An alternative energy boiler system which will use coal, municipal waste, and agricultural waste to generate electricity and steam. The system will supply all of the electrical requirements of the alcohol plants and will have a surplus of power that can be sold to local utility companies. The waste heat from this boiler system will be used to dry distiller's grains. Ground breaking on this phase of the project is planned for September of 1984.

-Three additional alcohol plants will bring the total at the Portales site to eight. These last plants will begin construction in the fall of 1984 and will begin operation in the spring of 1985.

-A drying facility to produce a human consumable flour from the distiller's grain. Beginning of construction on the drying facility is scheduled for the winter of 1984. Operation will begin in the summer of 1985.

The completion of these three future phases of the Mountain Development project will bring the total employment to 144. The annual economic impact due to payroll alone will then be $2,217,600.

Due to the infancy of the ethanol industry, large amounts of research and development are required to achieve the desired results of having an industry that is capable of operating at a profit without the benefits of assistance from state or local government. The short term viability is dependent on such aid. In the long term, each entity

within the industry must work to establish it's own viability in preparation for the time that there will be no governmental assistance. Once the industry is past the expensive period of research and development, it will then be able to settle into an era of profitable production. Until the transition from research and development to profitable operation can be completed, government assistance will be essential to the continued progress of the industry.

During both the infancy and the self-sustaining latter stages of the industry, alcohol production will have a tremendous beneficial effect on the economy due to the large amounts of grain that must be purchased, the numbers of people that must be employed, and the goods and services that must be obtained locally. The consideration just mentioned has to do only with the impact on the local economy of the area where an alcohol production facility is operation. An example of this is in that the first six months of 1984, our small company impacted the community of Portales (pop. 12,000) with over $1,980,400. This impact was only the direct purchase of goods and services plus the payroll, but does not take into consideration the overall effect of these monies as they move through the community. Given the time to complete the necessary research and development, our company, like other ethanol producers, will be a positive factor in the local economy well into the future.

The ethanol industry is having a similar beneficial affect on the national economy speaking only from the stand point of purchases of major pieces of equipment. The types of equipment are tanks, pumps, fabrication materials, boiler systems, automation equipment, and valves, to mention a small portion of required equipment. These equipment purchases are of relative short term benefit, but the support systems for replacement parts, maintenance, and services will remain as long as the industry continues to function. Our company, small by industrial standards, has made purchases of major equipment during the past 12 months that run into the millions of dollars. The purchases of major equipment will more than double during the next 12 months in order to meet the needs of the planning for future construction.

A major thrust of Mountain Development Corporation, and a potentially major economic factor in the entire ethanol industry, is the development of the by-product (distiller's grains) as a high protein source of food for humans. This company is presently in the midst of research regarding the possible uses of it's distiller's grains in baked goods such as breads, cookies, snack foods, and other human consumable foods which can be of importance both from the standpoint of human health and nutrition as well as economics. Mountain Development is engaged in a two year research and development process, the end result of which will be the production and distribution of foods for human consumption. Should the entire industry enter into this type of market, the impact will be both national and international. By current planning, Mountain Development's contribution to such a market will be 125,000,000 annual pounds of high protein human consumable flour produced from American

agricultural products. This company is presently in talks with food processing firms in Japan, Korea, and Taiwan that are interested in using far more distiller's grains than Mountain Development alone can produce.

Alcohol blended fuel usage is on the increase as the public becomes more accepting of them and marketing and distribution practices become more attuned to potential demands. The importance of ethanol as a gasoline additive is really three-fold in that it replaces the environmentally hazardous lead and at the same time creates an industry that can have a tremendous impact on the economy of the nation; and as the industry continues to grow, ethanol will play an increasing roll in the shift of national dependence away from foreign oil. It is difficult to picture ethanol replacing gasoline as a primary fuel, but it is totally reasonable to expect that ethanol will become a major source of fuel that will be environmentally favorable and economically beneficial.

Given the immediate real benefits that ethanol production brings to the local and national community, and potential for increased benefits in the future coupled with the decrease in dependence on the foreign supply of oil and ethanol's replacement of environmentally hazardous materials, it would seem wise for state and federal governments to commit at a minimum to maintaining, if not increasing, assistance to this emerging industry.

Mr. SKEEN. Thank you very much, Mr. Martz, and before we begin the questioning, which I will do with Congressman Durbin, they tell me that they are having trouble with feedback on these mikes. Pull them in closer to you.

Mr. DURBIN. Mr. Martz, I enjoyed our trip to your facility yesterday. It is certainly a beautiful operation and one that I am sure is a credit to the New Mexico economy.

I am glad to hear of it. Would you address the question we asked of the earlier panel about the price differential regarding the charge for ethanol in New Mexico as opposed to other States?

Mr. MARTZ. I am sorry. I am really not well prepared to answer that question. I feel there are people on the panel who could address that so I would like to avoid it if I may.

Mr. DURBIN. Would anyone else on the panel like to address that. Mr. Clark?

Mr. CLARK. I would like to make a couple of statements toward that. One being, as I said in my testimony, in plants that are marketing ethanol today in the Midwest around the heavily concentrated areas are, again, byproduct plants, meaning those plants were constructed to process corn for other purposes and the primary income was from foreign oil and that type of thing and ethanol was not their intent.

The other thing that Dave Hallberg is much more versed on than I am but the import/export legislation over State lines does affect how this marketing takes place. In New Mexico we enjoy the new import rule which means anyone bringing in outside ethanol does not enjoy a tax incentive which does have a tendency to help us out.

I would basically call that a price war in the Midwest. People are, as David pointed out, losing money marketing product in an out-and-out price war using either byproduct or adequate capitalized companies owning those to try to get their share of the market.

I don't know the solution but I do say that this needs to be dealt with and it can't be here today. It needs to be dealt with to not inhibit the growth in other areas where the capital incentive payback is big.

Mr. DURBIN. Mr. Martz, one of the things that you treated us to last night and I believe available in the lobby today where some of the few products available from the stillage process.

I commend those to all the people here. Can I ask you what type of relationship you have had with the U.S. Department of Agriculture and the FDA in your efforts to grade this food quality product?

Mr. MARTZ. Our initial concern with the FDA was compliance. We have been in contact with them. We have had them visit our plant and we have explained to them the extent of our project and exactly what direction we are going so that we can receive feedback from them as to what we will have to do to comply. At present the plants that are complying with any requirements that FDA might place upon us.

In the future as we go into the drying facility as we begin the actual food grain end of the operation, we will continue to be in contact with them and we will receive the input that we need.

Mr. DURBIN. Thank you very much.

Mr. SKEEN. Congressman Sensenbrenner.

Mr. SENSENBRENNER. Thank you very much.

Mr. Bishop, one of the things that we in Congress were interested in when we grant a subsidy as we granted the ethanol industry is whether we are getting a dollar's worth of good out of a dollar's worth of subsidy and Congress, I think, has been legitimately criticized for being a little bit too generous with the subsidies on the whole.

I think we all recognize that there have been some pretty hefty Federal and State subsidies to encourage the development of the ethanol industry and yet under the previous management of Midwestern those were not enough and the company had to file for reorganization under chapter 11.

In your prepared statement you stated that you were trying to arrange debt equity financing of about $3 million to rehabilitate the Clovis and Roswell plants to get them operating again, but this is not a normal bankable transaction.

Those are your words, not mine.

Mr. BISHOP. Correct.

Mr. SENSENBRENNER. How do you intend to raise this money and when do you think that these plants will be back in operation and people who have been laid off as a result of the chapter 11 filing will start getting recalled back to work?

Mr. BISHOP. Congressman, we are now in the area of putting the various legal and dealings with that financing because of the chapter 11 filing. There are certain things that we have to file with full disclosure and so forth with the SEC and also with the Bankruptcy Court. The funds will be raised through either one or two ways, either through a debt equity offering, which is an equity offering position with the Midwestern companies and one of its subsidiaries and then a collateralized debt offering as a unit.

The other way is to do the letters of credit and by utilizing the letters of credits, whoever offers the letters of credit and give them equity positions in the company. That is the direction now.

The time period you are talking about, just getting through the normal court procedure of the chapter 11 filing, somewhere in 60 to 90 days.

Mr. SENSENBRENNER. Earlier today there was some mention that consideration was given by Governor Anaya and the New Mexico Legislature to cut it back on State subsidy for ethanol production. If that should come to pass, would Midwestern be able to make it even with the reorganization and with the debt equity financing?

Mr. BISHOP. If you sell your alcohol at somewhere around the 1983 level, it gets real marketable. If it gets below that, your IRB's are not——

Mr. SENSENBRENNER. So you exceed the funds of the company; then the people that do invest money in Midwestern are left at the whim of whichever legislature is elected by the voters of this State in November?

Mr. BISHOP. Yes, I think.

Mr. SENSENBRENNER. Thank you.

Mr. SKEEN. Thank you very much. Just a quick question for the entire panel. All of us have been very much concerned about the

financial structure of these companies and how they evolved and so on. Much has been said, and I appreciate very much the forthrightness that we have seen from you today, and we wanted to ask you questions like, how are you going to do it, when are you going to do it, what is possible in this thing?

Several interesting things were mentioned, and I don't want to dwell on it too long because we are still tight on time, but I think this business of how acquiring insurance on productivity in the formation of these companies that I think you referred to, Mr. Clark. Could you expand on that a little bit?

In other words, how do you safeguard yourselves? I know you also mentioned too that some of the new investment plans for these plants, whether they have IRB's or bonds, or whatever, do not allow an investor to pull their money out of the formation. Can any or all of you talk just briefly on what kind of new approach you have for investments and production of these things and how quickly can you come up to the point where cash flow in the situation, because of your productivity, takes care of your financial obligation?

I know that is a big problem, but if you can answer the question, I would appreciate it.

Mr. CLARK. Since I alluded to that, Congressman Skeen, I had observed many financial packages that are being put together and if you will look, there has been a slowdown of approvals, as well as put-togethers, and what causes the building of a plan to come from a gleam in the eye to fruition is funding. And because of capitalizing on mistakes and casualties of others, the finance community, as well as the developmental community, has gone in and obtained insurance companies that will cover performance bonds on the contractor and the engineer. If the contractor doesn't perform, there is insurance to cover this, so the lender can be protected for a given period.

There are umbrella bonds to cover performance of different segments of development and construction finance of the different phases of the business. They get rather complex, but basically it is required to get debt equity from the finance community.

Mr. SKEEN. Well, is the cost of acquiring these kinds of insurance and bonds extremely high? I would kind of wonder.

Mr. CLARK. It is. I would liken it to the acquisition of land in strip mining. It has to be figured into the cost.

Mr. SKEEN. Does anyone else have a comment on that part of the problem?

[No response.]

Mr. SKEEN. Mr. Martz, I want to ask you how are you now in your development phase as far as cash-flow covering your cost of production and so forth? Are you turning a profit now, or are you still carrying it?

Mr. MARTZ. We have been in the black since June.

Mr. SKEEN. In the black since June?

Mr. MARTZ. Yes.

Mr. SKEEN. That is very interesting.

Mr. Clark, you mentioned something about mismanagement, part of the problem. Could you narrow that down? Was there anyone who came out with some of the problems that we have had

in the past that benefited by this, or was there a total loss across the board of the entire group that put this operation together that we are trying to pick up now?

Mr. CLARK. Well, I don't know all the factors, but I will say that it is rather evident, when packages are sold through public brokers, they make a commission up front, those people collect their money.

Mr. SKEEN. So somebody made a profit out of this?

Mr. CLARK. Somebody made a profit.

Other people, I think some construction people, made a profit prior to the last phase of construction.

Mr. SKEEN. But not as far as the corporate organizers and investors and so forth of the actual physical body of the companies that they are involved in that you know of?

Mr. CLARK. From what I know and from what I have heard, everyone lost. Now somebody may have had a side bank account, but these are things that I don't know and can't address, but from what I do know, there is a tremendous amount of capital pumped in, and I will say this sincerely, from what I know and what I have heard, there was a serious effort by the people of the company borrowing funds even personally on life insurance to pump into the company to get it into the profitable mode, so I can't think that anybody profited from it.

Mr. SKEEN. You mentioned the Governor's pronouncement about he wanted to take another look at these incentives that had an adverse effect on pending loans that were existent at that time. The Government recanted later. Did that ease the pressure, or had the damage been done in your opinion?

Mr. CLARK. In my opinion, the damage had been done because after the Governor did come back, there was a lot of publicity given to the fact that the Governor was solidly behind the ethanol industry in the tax incentive, but then prior to these loans being taken out that were due in January, the legislative session began and the legislators started bringing it up.

Mr. SKEEN. I have no further questions. Thank you all very much. We appreciate your being here today.

STATEMENTS OF DONALD Z. FORCIER, ACCOMPANIED BY ROBERT A. ROBINSON, U.S. GENERAL ACCOUNTING OFFICE, RESOURCES, COMMUNITY AND ECONOMIC DEVELOPMENT DIVISION; CALEB CHANDLER, SENATOR, STATE OF NEW MEXICO; JAMES P. O'NEILL, ASSOCIATE DIRECTOR, DEPARTMENT OF TAXATION AND REVENUE, STATE OF NEW MEXICO; AND DOC WEILER, EXECUTIVE VICE PRESIDENT, ASSOCIATION OF COMMERCE AND INDUSTRY OF NEW MEXICO

Mr. SKEEN. Panel number three is Mr. Donald E. Forcier who is accompanied by Mr. Robert Robinson from the U.S. General Accounting Office. We have Senator Caleb Chandler from Clovis and Mr. James O'Neill, Associate Director of the Department of Taxation and Revenue of the State of New Mexico and Mr. Doc Weiler, Executive Vice President of the Association of Commerce and Industry of New Mexico.

We are glad to see you all here, and would you proceed, Mr. Forcier. We would appreciate it very much. We are still struggling with time, and we would appreciate your brevity.

Mr. FORCIER. Thank you very much, Mr. Chairman. I will try to be very brief.

We are both very pleased to be here today to discuss the GAO's report of June 1984 on the subject of the ethanol tax incentive. The report was requested by Senators Charles Percy, David Durenberger, and James Exon. They asked us to gather information on the costs and benefits associated with the tax incentive at the national level.

In conducting our review, we assessed the importance of the incentive to the ethanol industry and attempted to measure the industry's impact on various factors such as national economy, the Federal budget, and national energy. I would like to focus my remarks on our findings and conclusions in each of these areas.

First, with regard to the importance of the incentives to the industry, based on our review of the relative ethanol and gasoline selling prices, as well as ethanol production prices, we found that unsubsidized ethanol has not been able to compete with gasoline in the marketplace. Over the last 3 years, ethanol has sold for about 60 to 85 cents a gallon more than unleaded gasoline. Today fuel ethanol generally sells for about 85 cents more.

Our analysis shows that ethanol production costs have been historically higher than gasoline selling prices. For example, the best available production cost data we could obtain suggested that at $3 a bushel for corn ethanol production costs converge at about $1.40 a gallon, considerably more than the 85 cents to $1 a gallon wholesale gasoline prices that have prevailed over the last few years.

Recognizing these financial considerations, the ethanol industry has been and continues to be largely dependent on Federal tax incentives, and I think another factor which underscores that is the fact that the industry was virtually not existent prior to the passage of the tax incentive in 1978 and since then we have seen the industry grow rapidly and during the period of declining gasoline demand and high interest rates.

An important public policy question, Mr. Chairman, however, is whether the ethanol industry will be perpetually dependent upon Federal tax incentives for its survival. We found that the price gap between unleaded gasoline and ethanol has actually widened over the last 3 years. While technological advances that could lower the real cost of ethanol production are possible and even likely, industry members we spoke with suggested that cost reductions would most likely be marginal, especially if corn remained a primary ethanol feedstock.

As a result, future ethanol competitiveness probably depends on a significant increase in the price of oil. If current crude oil to gasoline price ratios are maintained, crude oil prices would have to increase to about $50 a barrel to result in gasoline prices reaching ethanol prices.

Predictions as to whether this might occur and, if so, when it might occur are very speculative. Lacking such a fuel price increase, the fuel industry's success in entering the high-octane gasoline component market could be an important component in deter-

mining its future competitiveness. When blended with gasoline, ethanol provides a substantial octane boost much like conventional petroleum derived octane components.

The high octane components cost more than the final unleaded gasoline itself. However, as currently marketed, most ethanol is sold to fuel distributors who mix it with gasoline at a distribution point. As such, ethanol is displacing unleaded gasoline, not the higher value high octane gasoline components, and consequently must be priced competitively with the final unleaded gasoline product. If the refinery industry viewed ethanol as a viable substitute for these higher priced components rather than as a displacer for the completed unleaded gasoline, its competitive position would be improved, and its chances for economic self-sufficiency enhanced.

For example, compared to the wholesale unleaded gasoline price of about 70 cents a gallon, toluene petroleum derived octane component sells for about 95 cents a gallon. Ethanol would, therefore, be 20 cents closer to being competitive to toluene than unleaded gasoline. It is unlikely that there would be an increasing demand for high octane products in the future as a result of the Government's policy for phasing down lead use in gasoline.

Since passage of the Clean Air Act of 1977, the Federal Government has markedly reduced the allowable levels of lead in gasoline. Recently the EPA announced its intentions to reduce allowable levels even further. As a result, refiners unable to use lead as an octane source will be seeking alternative octane sources and ethanol could become one of the sources to meet that demand.

With regard to the economic impacts of the tax incentives, from virtually any incentive, the ethanol industry has had only a modest impact on the U.S. national economy.

Local economics are quite different. Fuel ethanol production met only about one-fifth of 1 percent of gasoline demand in 1982 and is projected to meet only about 1 percent gasoline demand by 1985.

Accordingly, while economic impacts in certain localities could be significant, the industry's impact on national outlook, employment, agricultural prices, and the Federal budget is small.

Considering the Federal budget, we found in 1982 the incentives resulted in about a $100 million tax loss to the Treasury. This loss was at least partially offset by reduced agricultural support programs attributable to the ethanol industry's demand for corn.

Because the industry's output on total national output and income could not be precisely calculated with available information, it is not possible to calculate the industry's net input in tax revenue. In any case, in 1982, it was less than $100 million.

We found that in 1982, the industry was responsible for the employment of about 19,000 jobs, not necessarily additive. We weren't able to calculate the degree of displacement involved, but about 19,000 people were involved directly and in support of industries, and if the output would grow to 1 billion gallons per year, that would result in about 49,000 jobs nationwide.

The economic sector most directly impacted by large-scale ethanol production is, of course, the agricultural sector. Each barrel of corn yields about 2½ gallons of ethanol. Accordingly, allowing for small volumes of ethanol being produced from other feedstocks, we

estimated that in 1983 the ethanol industry required about 150 million bushels of corn or about 2 percent total corn use for the year.

Using a Department of Agriculture econometric model, we estimated that this demand increased the national average corn price by about 49 cents per bushel. Assuming an ethanol production level of 1 billion gallons by 1990 with an associated demand for corn of about 400 million bushels, we projected a price impact of about 15 cents per bushel.

Our analysis also indicated that 1983 ethanol production generated a 7-cents-per-bushel reduction in soybean prices and about a $393 million increase in net farm income.

While not large on a national scale, our work again showed that price and income impacts on local markets surrounding ethanol plants can be more dramatic. One producer we spoke with said corn purchases by his firm have generated corn price increases as large as 15 cents a bushel in his local grain market.

With regard to the impact on national security, domestically produced fuel ethanol enhances national energy security by reducing U.S. dependence on imported oil from the Middle East and other politically unstable regions. However, as with the industry's economic impact, fuel ethanol's impact in national energy security is small because the industry's current and projected input represents a small fraction of gasoline demand.

We estimate in 1982, ethanol production made it possible to save about 5 million barrels of oil, or about 1 day's worth of current input. Higher production levels would obviously permit larger oil import predictions. For example, if the production capacity expands enough to permit 1 billion gallons of ethanol production, about 30 million barrels or the equivalent of about 6 days' of current imports could be saved while remaining very small.

There are indications that ethanol's contribution to energy security could expand during a fuel supply emergency even with current capacity. Industry analysts estimate that in 1983, there was about 175 million gallons of capacity that could have been pressed into service if an all-out production became necessary. Much of the surge capacity involved shifting output of wet corn milling plants in the Midwest from corn sweetner to ethanol production.

Our overall conclusions of our study, Mr. Chairman, that based on our assessment of currently identifiable costs in benefits surrounding the Federal ethanol tax incentives, we believe that it is appropriate to continue these incentives until the currently scheduled 1992 expiration date. The private sector has invested considerable sums of money in fuel ethanol plants. Total plant value exceeds $1 billion, with the expectation that the market created by the incentives would be present at least until 1992, when the incentives are scheduled to expire.

Removing the incentives at a time when ethanol remains uncompetitive with gasoline could be viewed as a break in faith that could not be justified by any expectation of major budget savings or significant economic gains.

I will be happy to answer any questions you may have.

[The prepared statement of Donald Z. Forcier follows:]

United States General Accounting Office
Washington, D.C. 20548

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Tuesday, August 14, 1984

STATEMENT OF

DONALD Z. FORCIER

SENIOR GROUP DIRECTOR

RESOURCES, COMMUNITY, & ECONOMIC

DEVELOPMENT DIVISION

BEFORE A JOINT HEARING OF THE

SUBCOMMITTEE ON INVESTIGATION AND OVERSIGHT

COMMITTEE ON SCIENCE AND TECHNOLOGY

AND THE SUBCOMMITTEE ON WHEAT, SOYBEANS,

AND FEED GRAINS

COMMITTEE ON AGRICULTURE

UNITES STATES HOUSE OF REPRESENTATIVES

40-678 0 - 85 - 15

Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today to discuss the General Accounting Office's report on federal fuel ethanol tax incentives dated June 6, 1984.[1] The report was requested by Senators Charles Percy, David Durenberger and J. James Exon who asked us to gather information on the costs and benefits associated with the tax incentives.

BACKGROUND ON INCENTIVES

The federal government has provided a variety of financial incentives to promote the development of the domestic fuel ethanol industry including tax incentives, loan guarantees, cooperative agreements, and research grants. The cornerstone of the incentives, however, is the partial exemption of gasohol (a blend of 10 percent ethanol and 90 percent unleaded gasoline) from the 9 cents a gallon federal gasoline excise tax. This exemption, initially set at 4 cents a gallon in 1978, was increased to 5 cents a gallon in 1983 and was recently increased to 6 cents a gallon as part of the Deficit Reduction Act of 1984. Because only one tenth of a gallon of ethanol is needed to exempt the entire gallon of mixed fuel from tax, the tax advantage amounts to 60 cents per gallon of ethanol.

In addition to the federal exemption, many states provide exemptions from state gasoline taxes. These state incentives range from 1 cent a gallon to 11 cents a gallon with most falling

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[1]Importance and Impact of Federal Alcohol Fuel Tax Incentives (GAO/RCED-84-1, July 6, 1984)

in the range of 3-5 cents per gallon. Thus, in a state with a 4 cents a gallon exemption the combined federal and state exemptions would be 10 cents per gallon of gasohol or $1.00 per gallon of ethanol. As a result, fuel distributors could afford to pay $1.00 a gallon more for ethanol than they do for unleaded gasoline and be able to sell the resulting mixture for the same net price.

In conducting our review we assessed the importance of the incentives to the fuel ethanol industry and attempted to measure the industry's impact on various factors such as the national economy, the federal budget, and national energy security. I would like to focus my remarks on our findings and conclusions in each of these areas.

IMPORTANCE OF FEDERAL INCENTIVES TO THE INDUSTRY

Based on our review of both relative ethanol and gasoline selling prices as well as ethanol production costs, we found that unsubsidized ethanol has not been able to compete with gasoline in the marketplace. Over the last 3 years ethanol has sold for about $ .60 - $ .85 a gallon more than unleaded gasoline. Today, fuel ethanol sells for about $ .85 more. Our analysis showed that ethanol production costs have historically been considerably higher than gasoline selling prices. For example, the best available production cost data we could obtain suggested that at $3 a bushel for corn (the primary ethanol feedstock), ethanol could be produced for about $1.40 a gallon, considerably higher than the $ .80 - $1.00 a gallon wholesale gasoline prices that have prevailed

over the last few years. Recognizing these financial considerations and the views expressed to us by ethanol producers, fuel distributors, and members of the financial services industry, it appears that the creation and expansion of the fuel ethanol industry has been and continues to be largely dependent on federal tax incentives.

A crucial public policy question, however, is whether the fuel ethanol industry will be perpetually dependent on federal incentives for its survival. We found that the price gap between unleaded gasoline and ethanol has actually widened over the last 3 years. While technological advances that could lower the real cost of ethanol production are possible and even likely, industry members we spoke with suggested these cost reductions would most likely be marginal especially if corn remained the primary ethanol feedstock. As a result, future ethanol competitiveness probably depends on a significant increase in the price of oil. If current crude oil to gasoline price ratios are maintained, crude oil prices would have to increase to over $50 a barrel to result in gasoline prices reaching ethanol prices. Predictions as to whether this might occur and, if so, when it might occur are highly speculative.

Lacking such an oil price increase, the fuel ethanol industry's success in entering the high octane gasoline component market could be an important factor in determining its future competitiveness. When blended with gasoline, ethanol privides a substantial octane boost much like conventional petroleum-derived

octane components. The high octane components cost more than the final unleaded gasoline itself. However, as currently marketed, most etnanol is sold to fuel distributors who mix it with gasoline at a distribution point. As such, ethanol is displacing unleaded gasoline not higher value, high octane gasoline components and consequently must be priced competitively with the final unleaded gasoline product. If the refinery industry viewed ethanol as a viable substitute for these higher priced components rather than as a displacer of the completed unleaded gasoline, its competitive position would be improved and its chances for economic self-sufficiency enhanced. For example, compared to the wholesale unleaded gasoline price of about $ .75 a gallon, toluene (a petroleum derived octane component) sells for about $ .95 a gallon. Ethanol would therefore be $ .20 closer to being competitive with toluene than unleaded gasoline.

It is likely that there will be an increasing demand for high octane components in the future as a result of the government's policy of phasing down lead use in gasoline. Since passage of the Clean Air Act in 1977 the federal government has markedly reduced the allowable levels of lead in gasoline. Recently, the Environmental Protection Agency announced its intentions to reduce allowable levels even further. As a result refiners unable to use lead as an octane source will be seeking alternative octane sources and ethanol could become one of the sources to meet that demand.

ECONOMIC IMPACTS

From virtually any perspective, the fuel ethanol industry has had only a modest impact on the U.S. economy. Fuel ethanol production met only about one-fifth of 1 percent of gasoline demand in 1982 and is projected to meet only about 1 percent of gasoline demand by 1990.

Accordingly, while economic impacts on certain localities could be significant, the industry's impact on national output, employment, agricultural prices, and the federal budget is very small. For example, concerning the federal budget, we found that in 1982 the incentives resulted in about a $100 million tax loss to the Treasury. This loss was at least partially offset by reduced agricultural support program costs attributable to the ethanol industry's demand for corn. Because the industry's impact on total national output and income cannot be precisely calculated with available information, it is not possible to calculate the industry's impact on tax revenue. Consequently, it is impossible to conclusively determine the industry's net revenue impact. In any case, the impact is not large.

The economic sector most directly impacted by large scale ethanol production is of course the agricultural sector. Each bushel of corn yields about 2.5 gallons of ethanol. Accordingly allowing for small volumes of ethanol being produced from other feedstocks, we estimated that in 1983 the ethanol industry required about 150 million bushels of corn or about 2 percent of

total corn use for the year. Using a Department of Agriculture econometric model, we estimated that this demand increased the national average corn price by $ .04 a bushel.

Assuming an ethanol production level of 1 billion gallons by 1990 with an associated corn demand of about 400 million bushels, we projected a price impact of about $ .15 a bushel. Our analysis also indicated that 1983 ethanol production generated a $ .07 per bushel reduction in soybean prices and a $393 million increase in net farm income. While not large on a national scale, our work again showed that price and income impacts on local markets surrounding ethanol plants can be more dramatic. For example, one producer we spoke with said corn purchases by his firm have generated corn price increases as large as $ .15 a bushel in his local grain market.

NATIONAL ENERGY SECURITY IMPACTS

Domestically produced fuel ethanol enhances national energy security by reducing U.S. dependence on imported oil from the Middle East and other politically unstable regions. However, as with the industry's domestic economic impact, fuel ethanol's impact on national energy security is small because the industry's current and projected output represents only a small fraction of gasoline demand.

We estimate that 1982 ethanol production made it possible to save about 5 million barrels of oil or about one day's worth of current imports. Higher production levels would obviously permit larger oil import reductions. For example, if the industry's

production capacity expands enough to permit one billion gallons of ethanol production, about 30 million barrels or the equivalent of 6 days of current imports could be saved. While remaining very small, there are indications that ethanol's contribution to energy security could expand during a fuel supply emergency even with current capacity. Industry analysts estimated that in 1983 there was about 175 million gallons of capacity that could have been pressed into service if all-out production became necessary. Much of this surge capacity involved shifting the output of wet corn milling plants in the Midwest from corn sweetener to ethanol production.

OVERALL CONCLUSIONS

Based on our assessment of currently identifiable costs and benefits surrounding the federal fuel ethanol tax incentives, we believe that it is appropriate to continue these incentives until their currently scheduled 1992 expiration date. The private sector has invested considerable sums of money in fuel ethanol plants--total plant value exceeds $1 billion--with the expectation that the market created by the incentives would be present at least until 1992 when the incentives are scheduled to expire. Removing the incentives at a time when ethanol remains uncompetitive with gasoline could be viewed as a break in faith that could not be justified by any expectation of major budget savings or significant economic gains.

I would be happy to answer any questions you might have at this time.

Mr. SKEEN. Thank you, Mr. Forcier. At this time we will have Senator Caleb Chandler.

Mr. CHANDLER. Thank you.

First let me thank all of you for having enough interest to come to New Mexico to hold these hearings. I know that your time is short, and you have heard a lot of good factual testimony already, so I will try to be brief.

But to give you a little background on our New Mexico law, in 1978, I was contacted by several individuals who were concerned about agriculture and the future of agriculture and the future of the ethanol industry. During our discussions, I was convinced that the production of ethanol would benefit agribusiness, decrease our dependence on foreign oil, provide an octane enhancer that was lead-free and that it would be an excellent industry for New Mexico, particularly for the east side of the State.

I introduced tax incentive legislation which provided that ethanol produced in New Mexico would be exempt from all State taxes through July 1985. This was passed in the 1980 session of the legislature with the help of Representative Patterson and other area legislators. In 1981, we extended the cutoff date to 1987.

During the 1983 session of the legislature, I introduced another bill which continued the incentive until 1991. The full exemption is allowed until July 1987 and phases down at the rate of 3 cents per year until 1990 with a final 2-cent incentive through June 1991. The incentive will be completely phased out in July 1991.

We also included language at that time that the feedstock used to produce the ethanol had to be 50 percent New Mexico grown, and this is the law in New Mexico today. We wanted New Mexico to be a leader in the ethanol industry, and I believe that we are accomplishing that goal as today 178 plants have been constructed in New Mexico.

Naturally, the Federal fuel ethanol tax incentives have stimulated private sector investments in excess of $1 billion. This investment was made with the expectation that the exemption would be in place until 1992. In New Mexico, there has been private sector investment in excess of $80 million in a very short period of time. This, too, was made with the expectation of its being in place until the scheduled phasedown.

If the incentives were taken away at this time, it would be an obvious break in faith that could possibly harm the investment of any alternative energy source indefinitely.

On the State level, when the legislature tried to pass bills in the 1984 session to decrease the tax incentive, the credibility of the State was seriously questioned by my investment firms. The availability of financing for the new industry in the State has subsequently diminished greatly.

I have heard the argument that the ethanol subsidy proves that the industry is unable to compete in a so-called free marketplace. However, the majority of Federal energy tax expenditures, according to the June 1984 GAO report, go to the gas and oil industry.

Almost 22 billion dollars in 1978 to 1982. During this same period, the alcohol fuel tax exemption accounted for only $50 million; alternative fuel production credit $420 million and alcohol

fuel blended $120 million. The point is that the market seems to work against the oil and gas industry also.

Since the industry, the ethanol industry in the State of New Mexico, there was an increase of 275 jobs when all plants were operational. When the plants at PMCI closed, over 150 of those people lost their jobs. It is expected that the plants will reopen in the near future, which will allow these individuals, some of whom are on unemployment, to become gainfully employed once again.

When using an employment and gain usage projection for a 5-million-gallon-a-year plant from construction to production, we come up with the following numbers: During construction, an average of 75 employees with peak periods of 150 employees, permanent jobs ranging in the area of 40 to 50 people.

The annual usage of grain after startup is 112 million pounds per year. The projection is applicable when the plant is reaching capacity and production. The State of New Mexico has been generally very supportive of the industry. The state has budgeted for an alcohol fuels promotion and development program through the Industry and Minerals Department and plant training funds have been awarded through the Economic Development and Tourism and the Ethanol Producers Technical Assistance Unit has been started.

The Research and Development Institute has recently made available funds for an economic impact study to be completed by the end of January, 1985.

There has been an impact on the trucking industry, the agricultural industry, and the construction industry, and, of course, the ethanol industry will provide employment and stability to the rural communities if it continues to get the support needed for its development.

Actual impacts on the economy will be better stated in the economic impact study which will be available to all those who request it after January 1985.

It is important to remember that the greatest impact is not the short-term but rather the long-term. Any new industry is plagued with problems initially, as is the ethanol industry. The industry must work through the technological problems, as well as financial and managerial. The importance of providing strong support needed in its developmental stages cannot be overemphasized.

The long-term benefits will be a stable future tax base, greater national security through decentralization of fuel resources and a very valuable octane enhancer during the critical lead phasedown. In order for the State and Nation to reap the long-term benefits, it must not overemphasize the short-term problems but rather look at the incentives as an investment.

Thank you. I will be happy to answer questions.

[The prepared statement of Caleb Chandler follows:]

STATEMENT OF

Caleb Chandler

New Mexico State Senator

Before the

Subcommittee on Investigations and Oversight
of the
Committee on Science and Technology

and the

Subcommittee on Wheat, Soybeans, and Feed Grains
of the
Committee on Agriculture

U.S. HOUSE OF REPRESENTATIVES

Joint Congressional Field Hearing

Clovis, New Mexico

August 14, 1984

In 1978 I was contacted by several individuals who were concerned about the future of agriculture and the Ethonal industry. During our discussions I was convinced that production of ethanol would benefit agri-business, decrease our dependence on foreign oil, provide an octane enhancer that was lead free and would be an excellent industry for New Mexico, particularly the East side of the state. I introduced tax incentive legislation which provided that ethanol produced in New Mexico would be exempt from all state taxes through July 1985. This was passed in the 1980 Legislature with the help of other area Legislators.

In 1981 we extended the cut off date to 1987. During the 1983 session of the Legislature I introduced another bill which continued the incentive until 1991. The full exemption is allowed until July of 1987 and phases down at the rate of three cents per year through 1990 with a final two cent incentive through June of 1991. The incentive will be completely phased out in July 1991. We also included language that the feed stock used to produce the ethanol had to be 50% New Mexico grown. This is the law in New Mexico today.

We wanted New Mexico to be a leader in the Ethonal industry and I believe we are accomplishing that goal. Eighteen plants have been constructed in New Mexico.

Nationally, the federal fuel ethanol tax incentives have stimulated private sector investment in excess of one billion dollars. This investment was made with the expectation that the exemption would be in place until 1992. In New Mexico, there has been private sector investment in excess of 80 million dollars in a very short period of time. This too was made with expectation of its being in place until the scheduled phase down. If the incentives were taken away at this time, it would be an obvious break in faith that could possibly harm the investment of any alternative energy source indefinitely.

On the state level, when the Legislature tried to pass bills in the 1984 session to decrease the tax incentive, the credibility of the state was seriously questioned by many investment firms. Availability of financing for the new industry in the state has subsequently diminished greatly.

I have heard the argument that the ethanol subsidy proves that the industry is unable to compete in a so called free market place. However, the majority of federal energy tax expenditures go to the gas and oil industry - almost 22 billion dollars in 1978-1982. During this same period, the alcohol fuel tax exemption accounted for only 50 million dollars, alternative fuel production credit 120 million and alcohol fuel blender credit 20 million. The point is, the free market theory seems to work against the oil and gas industry too.

Since the entry of the ethanol industry in the state of New Mexico, there was an increase of 275 jobs when all plants were operational. When the plants of PMCI closed, over 150 of them lost their jobs. It is expected that the plants will reopen in the near future which will allow these individuals, some who are on unemployment, to become gainfully employed once again.

When using an employment and grain usage projection for a 5,000,000 gallon a year plant from construction to production we come up with the following numbers.

During construction an average of 75 employees with peak periods of 150 employees. Permanent jobs range in the area of 40 - 50 people.

The annual usage of grain after start-up is 112 million pounds per year. The projection is applicable when plant is reaching capacity in production.

The state of New Mexico has been generally very supportive of the industry. The state has budgeted for an Alcohol Fuels Promotion and Development Program through the Energy and Minerals Department. In-plant training funds have been awarded through the Economic Development and Tourism. The Environmental Improvement Division has organized a Ethanol Producers Technical Assistance Unit. The New Mexico Energy Research and Development Institute has just recently made available funds for an economic impact study to be conducted and completed by the end of January 1985.

There has been an impact on the trucking industry, the agricultural industry, the construction industry and of course the ethanol industry will provide employment and stability to the rural communities if it continues to get the support needed for its development. Actual impacts on the economy will be better stated in the economic impact study which will be available to all those who request it after January of 1985.

It is important to remember that the greatest impact is not a short term but rather the long term. Any new industry is plagued with problems initially as is the ethanol industry. The industry must work through the technological problems, as well as financial and managerial. The importance of providing strong support needed in its developmental stages can not be overemphasized. The long term benefits will be a stable future tax base, greater national security through decentralization of fuel resources, and a very valuable octane enhancer during the critical lead phase down. In order for the state and the nation to reap the long term benefits, it must not overemphasize the short term problems, but rather look at the incentives as an investment.

RESUME

Caleb J. Chandler
1919 Miller
Clovis, N. Mex.
(505) 762-5959

PERSONAL

Date of Birth:	January 4, 1943
Place of Birth:	Clovis, New Mexico
Marital Status:	Married (4 children)
Health:	Excellent
Height:	6'0"
Weight:	173 pounds

EXPERIENCE

July 1967 to Present City of Clovis, New Mexico

Chief of Police of the Clovis Police Department - October 1, 1983. Responsibilities include management/administration direction of the Police Department. The Police Department has 75 full-time employees and a total budget of $1,926,182.00.

Management responsibilities include developing departmental objectives, policies and procedures; assisting in the preparation of surveys, proposals, Federal and State grants, budget and resource material; supervision of all department shifts; coordinating major investigations; and handling citizen complaints. A major accomplishment has been implementation of the Team Policing management concept.

January 1977 to Present

State Senator for District #27, Curry County, New Mexico. Committee assignments presently are Finance and Judiciary. Interim Committee assignments are Children & Youth Study Committee, Economic Development, New Technologies & Business Tax Study Committee and Western Council of State Governments. I was previously assigned to the Interim Committee on Criminal Justice Study Committee, Chairman, from January, 1977 to December, 1982.

1963 to July 1967 Pecos, Texas

Assistant Manager of Trans-Pecos Dairy. Responsibilities included management of a farm, beef cattle operation and a twenty-four hour dairy, book-keeping, doctoring and breeding cattle, ordering feed and supplies, sell of milk and cattle and supervision of twenty employees.

1961 to 1963 Clovis, New Mexico

Switchman for the Santa Fe Railroad. Responsibilities included a sorting of railroad cars into trains routed to other destinations.

EDUCATION

1961 High School diploma, Clovis High School, Clovis, New Mexico
1961 - 1962 Attended Eastern New Mexico University, Portales, New Mexico
1966 Graham School for Cattlemen, Garnett, Kansas
1970 Bureau of Narcotics and Dangerous Drugs, Long Beach California
1971 Law Enforcement Academy, Basic Course, Santa Fe, New Mexico
1974 National F.B.I. Academy, Quantico, Virginia
1979 Baylor College of Medicine, Hypnotherapy, Houston, Texas
1979 Law Enforcement Hypnosis Institute, Basic, Los Angeles, California
1980 Law Enforcement Hypnosis Institute, Advanced, Los Angeles, California
Numerous other Law Enforcement Courses

PROFESSIONAL MEMBERSHIPS

F.B.I. National Academy Associates
Society for Investigative and Forensic Hypnosis

BOARD MEMBERSHIPS

Young Men's Christian Association
K.E.N.W. Television Station-Advisory
New Mexico Outdoor Drama Association

OTHERS

Coach for American Little League Baseball

DISTINCTIONS

National Police Officer of the Month, August 1975
Who's Who in America
Who's Who in Politics
Who's Who in the West

Mr. SKEEN. Thank you very much, Caleb.

Now Mr. O'Neill. It is nice to have you here.

Mr. O'NEILL. Mr. Chairman, my remarks will be very brief, because I think everything I was going to say was only addressed to the last question you asked on the tax incentives, and everything I was going to say I think has already been said by somebody else, so I think I can be really brief, Mr. Chairman.

Mr. SKEEN. We appreciate you more and more, as you go on.

Mr. O'NEILL. On pages 5 and 6 of my prepared testimony there are a couple of charts and numbers showing the production of ethanol in this State. Most of the, really, the industry got started here in the production capacity in the last couple of years and almost everything that has happened here has happened in the last 2 years.

Over this last fiscal year starting in July 1983, there were three companies here in several different plants producing approximately 240,000 gallons of ethanol. By March 1984, that had grown to almost 850,000 gallons of monthly production.

I think that surge, if nothing else, shows that the industry is growing rather rapidly in New Mexico. One of the major reasons is the tax credit. The tax credit, as has been mentioned here many times, is a total credit from the State gasoline tax, which is currently 11 cents. I say currently because it is variable based on the wholesale price of gasoline.

Since the high water mark in March, which you had testimony on in panel No. 2, about why production has come down since then, we are now running 300,000 gallons a month.

On the fourth page of the statement, Mr. Chairman, I have some figures about the number of companies involved as distributors or blenders. In this State, as in most other States, the alcohol and ethanol producers don't do the blending themselves. It is handled by another set of firms. It seems like about every other month or so we get another wholesaler or blender involved. The number of gallons blended went from, in January 1983, about 12,000 gallons up to about 7.5 million gallons again in 1984. The industry has grown rather rapidly.

And, again, as you heard panel No. 2, production has dropped dramatically mainly because the largest firm went into bankruptcy. I would point out, Mr. Chairman, on these two tables of information, there is an administrative quirk that applies to both of them. Because these aren't taxes, but rather credits or incentives, if you will, we are operating them as a refund or a credit program, and, therefore, there is no penalty for late-filed returns. So the last month or two we don't have complete information.

Mr. Chairman, I would suggest that we may have been almost a little bit too successful in attracting this particular industry to the State. Since the highway department isn't here, I will put in a plug for them.

Mr. SKEEN. We would appreciate that.

Mr. O'NEILL. The credit amounts do come out of sources that are dedicated to the highway and State road fund which supports the State and local road systems.

As you know, Mr. Chairman, neither building or maintaining of highways is getting any cheaper. The highway department, and I

have seen some preliminary estimates, they are doing what they expect from their point of view would be a revenue loss over the next couple of years. They are forecasting $16 million a year, which was approximately 13 percent or so of the State sources that would go into the road fund.

Mr. Chairman, this is leading to the point that if a more uniform national policy were adopted at a somewhat higher level of incentive, this would help us.

Mr. SKEEN. Was that your last word, Mr. O'Neill?

Mr. O'NEILL. Other than thank you, Mr. Chairman.

[The prepared statement of James P. O'Neill follows:]

STATEMENT OF

JAMES P. O'NEILL
ASSISTANT SECRETARY
NEW MEXICO TAXATION AND REVENUE DEPARTMENT

AT THE JOINT HEARING OF
THE SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
OF THE
COMMITTEE ON SCIENCE AND TECHNOLOGY
AND
THE SUBCOMMITTEE ON WHEAT, SOYBEANS, AND FEED GRAINS
OF THE
COMMITTEE ON AGRICULTURE

Clovis, New Mexico
August 14, 1984

Mr. Chairman, I appreciate the opportunity to present some information to you and the members of both Subcommittees about the ethanol blended fuel (gasohol) industry in New Mexico. My remarks will be confined to an explanation of the state tax incentives for the ethanol blended fuels industry, a look at the current levels of activity and some general comments.

New Mexico Tax Incentive for Ethanol Production

The New Mexico Gasoline Tax Act defines "gasoline" as any flammable liquid used primarily as fuel for the propulsion of motor vehicles, motor boats or aircraft. Without special provisions to the contrary, ethanol used either alone or in combination with other liquids as fuel for motor vehicles would be subject to the state gasoline tax. Currently that tax rate is eleven cents per gallon. Generally the tax and reporting requirements are imposed on the gasoline distributors and wholesalers, not retailers.

The New Mexico Legislature, however, created a special deduction for ethanol blended fuels in 1980. That original act has been amended three times since then; I will address only the current statutory scheme, a copy of which is appended to this statement.

The New Mexico legislation follows the federal practice of requiring that the blended fuel be at least ten percent ethanol in order to qualify for the tax incentive. We also require that the ethanol be manufactured exclusively in New Mexico and that, beginning July 1, 1987, at least 50% of the agricultural feedstocks used be from New Mexico sources.

Currently gasoline distributors receive a full deduction from otherwise taxable products for each gallon of ethanol blended fuel received during the reporting period. As mentioned, New Mexico's tax rate is now eleven cents per gallon. This will continue until July 1, 1987. After that, the tax advantage is phased out in steps. Ethanol blended fuels will be fully taxable on and after July 1, 1991. The table below summarizes the level of deduction over this time period.

New Mexico Deduction per Gallon of Ethanol Blended Fuel

From	Through	Deduction
Present	June 30, 1987	$.11
July 1, 1988	June 30, 1988	.08
July 1, 1988	June 30, 1989	.05
July 1, 1989	June 30, 1990	.03
July 1, 1990	June 30, 1991	.02
July 1, 1991	thereafter	-0-

In addition, there is also a federal tax break for ethanol blended fuels. Until recently a deduction of five cents per gallon of gasohol was allowed from the federal gasoline tax of nine cents. The total tax incentives between the state and federal programs was thus sixteen cents per gallon. The new federal Deficit Reduction Act of 1984, however, raised the federal tax deduction to six cents per gallon effective August 1, 1984. The combined tax benefit is now seventeen cents.

The effect of these tax advantages is to create a powerful inducement for the production of ethanol. One gallon of ethanol, when added to nine otherwise taxable gallons of gasoline, produces tax savings of $1.70. This of course enhances the attractiveness of ethanol as a fuel for motor vehicles.

New Mexico's Ethanol Industry

New Mexico's incentive program is the most generous in the nation. The last time we looked, no other state provided more than a credit of eight cents per gallon of ethanol blended fuels. As a result, the industry has grown quite rapidly here, all within the last two years or so.

The table on the following page gives some indication of the actual and potential production capabilities now enjoyed by this industry in New Mexico. The figures shown are estimates drawn partly from the Taxation and Revenue Department records but mainly from information most kindly supplied to us by Mr. Charles Clark, President of the New Mexico Ethanol Producers Association.

New Mexico Ethanol Production by Location

Location	Company	Plants	Estimated Annual Capacity (Gallons)	Approximate Current Production (Gallons)
Clovis	Nelson Hart Enterp.	1	1,500,000	1,100,000
Clovis	West Texas Ethanol	1	1,000,000	1,000,000
Clovis	PMCI	7	7,000,000	(1)
Roswell	PMCI	3	3,000,000	(1)
Tucumcari	Grainpower	1	3,000,000	2,900,000
Portales	Mountain Develop.	2	3,000,000	2,300,000
			18,500,000	7,300,000

(1) In bankruptcy; not currently in production. Apparently will resume production in 1985.

In addition to the plants listed in the table, a company named Agrihol is planning a new plant of approximately 4,000,000 gallons capacity in Las Cruces. An inducement resolution for an industrial revenue bond has been secured. Plants to be located in Floyd, Dora and Clayton are also under discussion.

The tables on the next two pages illustrate just how rapidly the industry's fortunes have waxed. The first table shows the production levels for the several firms in operation during New Mexico's 1983-84 fiscal year. It shows a dramatic rise from a level of about 240,000 gallons in July, 1983 to about 840,000 by March, 1984. After that, production plummeted mainly because the largest producer went into bankruptcy and out of production. The capacity, however, remains and we hear that efforts are being made to bring the plants back on line.

Revised
TRD/TRS
8/10/84

Production of Ethanol Alcohol Reported Monthly
(Gallons)

Production Month	Company					
	Grain Power	Mountain Development Corporation	Nelson Hart	Process Management	West Texas Ethanol	Total
July, 1983	83,764	-0-	56,610	99,161	-0-	239,535
August	124,668	-0-	48,812	123,774	-0-	297,254
September	54,798	-0-	47,930	189,329	-0-	292,057
October	56,979	-0-	70,575	321,112	-0-	448,666
November	49,810	-0-	75,654	388,941	-0-	514,405
December	66,253	-0-	61,301	280,367	-0-	407,921
January, 1984	67,128	-0-	74,128	418,229	-0-	559,485
February	86,757	-0-	68,933	492,193	-0-	647,883
March	171,103	8,900	72,733	578,733	16,200	847,669
April	167,707	33,480	79,386	-0-	28,210	308,783
May	200,838	-0-	N.A.	-0-	49,666	N.A.
June	161,303	23,514	55,056	-0-	62,261	302,134

Revised
TRD/TRS
8/10/84

Gallons of Ethanol Blended Fuel Deducted by Reporting Distributors/Blenders

Month Received	Company											
	Zia	Thriftway	Tiguex	Southland	Sandia	Total Petroleum	Koch Fuels	Hillger	Foremost	Direct Sales Tire Co.	Others	Total
January, 1983	12,508											12,508
February	31,017											31,017
March	588,351											588,351
April	469,651										95,900	565,551
May	565,357										98,700	664,057
June	567,421	1,092,150									285,703	1,945,354
July	553,117	1,109,186	165,395								530,092	2,357,790
August	476,786	1,219,077	448,750	1,081,091							422,927	3,648,631
September	499,466	1,039,150	345,989	1,049,413							400,275	3,334,295
October	504,624	1,172,587	478,840	1,144,271	18,963						413,943	3,733,228
November	640,436	1,143,825	392,092	1,254,516	95,207	201,136					623,785	4,350,997
December	664,981	955,506	424,116	1,270,185	209,413	1,562,161					693,256	5,779,618
January, 1984	606,382	1,064,064	350,147	1,285,054	250,638	1,399,623	261,534				727,886	5,945,345
February	570,433	1,007,996	281,294	986,449	279,823	1,556,923	330,186	19,340			903,527	5,935,971
March	563,429	1,105,927	498,076	1,093,272	358,279	1,530,218	358,103	463,293	469,226	308,558	846,159	7,594,540
April	512,431	109,433	325,976	1,080,915	321,930	1,620,693	359,889	417,407	-0-	697,398	1,697,623	7,143,695
May	19,345	108,844	-0-	-0-	260,113	679,050	108,499	73,551	-0-	708,556	1,654,033	3,612,191
June	3,319	120,985	-0-	-0-	-0-	108,269	24,477	-0-	-0-	410,736	1,230,322	1,898,108

Note: Monthly totals do not agree with gasoline acquisition reports because late reports have been allocated back to the activity month.

Another way of looking at the acceleration in activity is presented by the last table. The ethanol producers typically are not directly involved with marketing ethanol blended fuels. This is handled by gasoline distributors. The number of companies involved and the volume of fuel marketed has jumped from virtually nothing in January, 1983 to well over 7,000,000 gallons by April, 1984. That is an impressive performance. (The decline in May and June is attributed mainly to the bankruptcy mentioned earlier. Also, not all returns relating to ethanol blended fuels have been received; because this is essentially a refund process, there is no penalty for late returns.)

General Comments

In testimony before various committees of the New Mexico Legislature over the last several years, two main arguments have been advanced for enacting (and later extending) a tax break for ethanol blended fuels. The first is a general economic development theme. By attracting the industry to New Mexico, new investment and jobs would be created. This is particularly important to a state that relies so heavily on one basic industry -- minerals production. Diversification is needed for the future.

The second was the opening of a new market for our agricultural sector. This would help rescue farmers from the tight squeeze on profits that they have suffered for several years.

The information presented here demonstrates that the effort to bring the industry to New Mexico has succeeded. Jobs and new market opportunities for

farmers have been created.

There is a problem though. We may have been a bit too successful. The industry has come to New Mexico and is burgeoning. Given current levels of state support, it could keep on expanding for some time. The market for ethanol blended fuels may be nearly co-extensive with that of unleaded gasoline, a market segment which itself is increasing. If so, we might expect tax revenues from sale of gasoline to fall in the future. Unfortunately, these taxes are the main state source from which state and local highway programs are funded. Roads haven't gotten any cheaper to build or maintain, so a fiscal crisis in this program area is not far off.

In other years, New Mexico might have simply allocated some of its general fund sources to the highway program. But now the state's general fund is not in the best of health. Taxes had to be raised in 1983. Another increase was avoided this year only because of a large, one-time receipt from the settlement of a lawsuit. New Mexico soon may not be in a position to continue the level of tax incentive now in the statutes.

If indeed the ethanol industry is important to the nation, a more balanced sharing between the federal and state governments of the costs of the incentives might be desirable.

7-13-4.1. Deduction; ethanol blended fuel.

In computing the gasoline tax due, gasoline received in New Mexico containing a minimum of ten percent by volume of denatured ethanol alcohol manufactured exclusively in New Mexico, of at least one hundred ninety-nine proof, exclusive of denaturants, known as "ethanol blended fuel," may be deducted from the total amount of gasoline received in New Mexico during the period July 1, 1980 through June 30, 1987, provided that satisfactory proof thereof is furnished to the revenue division of the taxation and revenue department.

History: 1978 Comp., § 7-13-4.1, enacted by Laws 1980, ch. 105, § 3; 1981, ch. 175, § 2; 1983, ch. 204, § 4; 1983, ch. 225, § 2.

1983 amendments. — Laws 1983, ch. 204, § 4, substituting "division" for "revenue division of the taxation and revenue department" at the end of the section, was approved April 6, 1983. However, Laws 1983, ch. 225, § 2, also amending this section, by substituting "ethanol blended fuel" for "gasohol" in the section catchline, inserting "denatured," and substituting "one hundred ninety-nine proof, exclusive of denaturants, known as 'ethanol blended fuel' " for "one hundred ninety proof, commonly known as 'gasohol,' " but not giving effect to the first 1983 amendment, was approved April 6, 1983. The section is set out as amended by Laws 1983, ch. 225, § 2. See 12-1-8 NMSA 1978.

Effective dates. — Laws 1981, ch. 175, contains no effective date provision, but was enacted at the session which adjourned on March 21, 1981. See N. M. Const., art. IV, § 23.

Laws 1983, ch. 204, contains no effective date provision, but was enacted at a session which adjourned on March 19, 1983. See N.M. Const., art. IV, § 23.

Laws 1983, ch. 225, contains no effective date provision, but was enacted at a session which adjourned on March 19, 1983. See N.M. Const., art. IV, § 23.

Am. Jur. 2d, A.L.R. and C.J.S. references. — 71 Am. Jur. 2d State and Local Taxation §§ 616, 628, 632.

7-13-4.2. Deduction; ethanol blended fuel produced using New Mexico agricultural products.

A. In computing the gasoline tax due, ethanol blended fuel manufactured exclusively in New Mexico shall be deducted from the total amount of gasoline received in New Mexico in the following amounts and during the specified periods, provided that at least fifty percent of the agricultural feedstocks by volume used in fermentation are produced in New Mexico and provided further that satisfactory proof is furnished to the revenue division of the taxation and revenue department:

(1) from July 1, 1987 through June 30, 1988, eight cents ($.08) per gallon;

(2) from July 1, 1988 through June 30, 1989, five cents ($.05) per gallon;

(3) from July 1, 1989 through June 30, 1990, three cents ($.03) per gallon; and

(4) from July 1, 1990 through June 30, 1991, two cents ($.02) per gallon.

B. The requirement of furnishing satisfactory proof to the revenue division of the taxation and revenue department pursuant to Subsection A of this section applies only to the deduction provided in this section and does not apply to the deductions provided in Section 7-13-4.1 NMSA 1978.

History: 1978 Comp., § 7-13-4.2, enacted by Laws 1983, ch. 225, § 3.

Recompilations. — Laws 1983, ch. 225, § 4, recompiles former 7-13-4.2 NMSA 1978, relating to legislative findings and declarations of purpose for the encouragement of the production of gasohol, as 7-13-4.3 NMSA.

Effective dates. — Laws 1983, ch. 225, contains no effective date provision, but was enacted at a session which adjourned on March 19, 1983. See N.M. Const., art. IV, § 23.

7-13-4.3. Findings and declaration of purpose.

The legislature finds and declares that the production and sale of ethanol blended fuel is of great importance to the state of New Mexico because such motor fuel pollutes the air less than conventional motor fuel, provides a new use and market for New Mexico agricultural products and reduces dependence on limited oil resources. Accordingly, it is declared to be the public policy of the state of New Mexico to encourage, through tax relief, the production within the state of ethanol blended fuel which contains denatured ethanol alcohol derived from New Mexico agricultural products.

History: Laws 1980, ch. 105, § 1; 1978 Comp., § 7-13-14.2, recompiled as 1978 Comp., § 7-13-14.3 by Laws 1983, ch. 225, § 4.

The 1983 amendment substituted "ethanol blended fuel" for "gasahol" once in each sentence and inserted "denatured ethanol" in the last sentence.

Effective dates. — Laws 1980, ch. 105, § 4, makes the act effective on July 1, 1980.

Laws 1983, ch. 225, contains no effective date provision, but was enacted at a session which adjourned on March 19, 1983. See N.M. Const., art. IV, § 23.

Mr. SKEEN. Thank you very much.

Now, Dr. Weiler, we are happy to have you here. You are also representing the highway department in a sense, are you not?

Mr. WEILER. Yes.

I think there is no doubt in anybody's mind today that we have a surplus of crude oil. It is reflected in the price of gasoline, as all of you have seen. It is reflected in the number of refineries that have gone out of business in the United States.

Years ago, we built substantial refining capability because of our anticipated needs, to be independent of foreign sources in this area. This went along very well until we all of a sudden went with the small-car syndrome, and its reduction in the needs came about rather rapidly.

American Petroleum Institute figures show that as of August 3, 1984, we have a nationwide oil refining overcapacity of somewhere near 82,677,000 gallons a day.

A new total ban on lead additives in gasoline can be expected in the near future. It will cost an additional $575 million to retrofit for this particular type of production. It will be reflected in the price of regular gasoline in various estimates of between 3 to 5 cents per gallon.

New Mexico is a producer of crude and it is also a refiner of crude. We are not isolated nor are we insulated from the marketplace. Much of our State revenues are produced by this single segment of our industry. It can't be ignored, nor can the contributions of the agribusiness to the economy of the State of New Mexico be ignored. They have to be considered no matter what you do and with the development of ethanol as a fuel alternative, again spawned by our quest for energy independence, it became evident that certain tax incentives were required in order to get the industry off the ground.

Incentives are not new in the development of industry. They can be accommodated when the overall benefits such as employment, such as capital investment, tax based development and all the spinoffs and rollovers that occur as a result of this kind of employment and development are considered.

Another factor which has to be considered in any discussion is the traditional use of user taxes to fund our road system. Whenever there is a disruption in the flow of those kind of dollars there is a corresponding adverse effect on road construction and on maintenance. Diversion of those funds from highway use is a problem particularly at the Federal level. The diversion of the 1 cent for mass transit in 1983 cost the highway trust fund $522 million. In 1984 that impact will reach $1.5 billion.

Our organization and the highway users certainly do not in any way disapprove of any meaningful efforts to expand the economic base of this State. Our true concern lies in the problems created long term for that expansion which could hurt the existing refining industry of this State and with their large capital investment and large employment.

In any further expansion, our concerns of our reliance in New Mexico on motor transport has to be considered. It is estimated that around 90 percent of all the industry requirements in the State of New Mexico, including retailers, are provided by motor

transport. It can only arrive over highways. Any erosion of the funds needed to maintain and construct these arteries have to cause us great concern.

To summarize our position, the developmental assistance to the current ethanol industry is not objectionable in its present status. Senator Chandler gave you what the phaseout is. We agree with it. Extension beyond the current levels are objected to because of the burden shift of highways costs to other highway users who cannot take advantage of such a program.

To reduce the production of gasoline from our New Mexico refiners would cause serious financial impact, with possible closing of some of the installations. Highway funding needs are increasing each year and tax increases on the lost revenues have to be borne by those unable or unwilling to use ethanol operating fuels.

We also feel that further concern to current Federal and State incentives are more than adequate to assist the development of the ethanol industry and many producers in some States are operating with no State incentives. If Federal and State incentives amounting to highway funding losses of over $391 million in 1983 are to continue, we urge the Congress and the State legislators to consider substituting general fund revenues for this development rather than the highway funds.

Thank you very much.

[The prepared statement of Mr. Weiler follows:]

STATEMENT OF H. J. "DOC" WEILER
Vice President, for Governmental Affairs
Association of Commerce & Industry

before the

Subcommittee on Investigations & Oversight of the
Committee on Science and Technology
and the
Subcommittee on Wheat, Soybeans & Feed Grains of the
Committee on Agriculture
U.S. House of Representatives

at
Clovis, New Mexico
August 14, 1984

I am Harold J. Weiler, Vice President for Governmental Affairs for the Association of Commerce and Industry. I am also Chairman of the New Mexico Highway Users Conference and a member of the National Highway Users Federation Board of Directors. I appreciate this opportunity to present our views on this important issue.

Whenever we address questions concerning energy independence we look at our current projections for production of our oil and gas sectors. There is no doubt in anyone's mind today that we have a surplus of feedstocks for our oil refining capacity and that there has been a lowering of prices for crude oil. A perusal of any of the trade journals and financial periodicals gives multiple reasons for all of this occurring, but all agree that no single factor created the condition. We built large refining capability to handle our anticipated needs to be independent of any foreign sources in this area. We could thus hold our prices to the consumer at a reasonable level. All was well until the great small car syndrome caught up with those forecasts and the needs for our refining

capacity took a nosedive. According to the American Petroleum Institute figures of August 3, 1984, our nationwide oil refining capacity is 16,074,000 bbls per day. We were using on that date 12,142,000 bbls of that productive capability for a net under use amounting to 3,932,000 bbls a day. Translated into gallons of gasoline at an average figure of 21 gallons per bbl of crude we have 82,677,000 gallons daily excess capacity.

When we reduce our refining for gasoline we also reduce our production of other needed petroleum products. There then is created a need for the importation of those to meet our domestic requirements.

Another new development has been the Environmental Protection Agency and its heavy accent on the reduction of lead in gasoline. New information that they have developed would indicate that the effects are being felt at much lower levels of exposure than was originally thought and a new total ban on lead additives in gasoline can be expected in the near future. This will cost the refining segment an additional 575 million dollars to retool for this production change and certainly will be reflected in the price of regular gasoline variously estimated at 3 to 5 cents per gallon.

All of these factors have not held the price of crude oil at constant high levels. The OPEC groups are having their own problems controlling the Saudis as evidenced by their recent barter deal for 10 new Boeing 747s. This involved 34 million bbls for 10 of the aircraft and increased their quota production to accommodate the transaction.

New Mexico is a producer of crude and a refiner. All the factors involving anything in these industries affects their operations. We are not isolated or insulated from the marketplace. Much of our state revenues are produced by this single segment of our economy. It cannot be ignored. At the same time we have a substantial agricultural industry in our state as well as our hard rock extractive economy. They must be considered in any efforts to diversify and develop our economic potential.

With the development of ethanol as a fuel alternative, again spawned in our quest for energy independence, it became evident that certain tax incentives were required to get the productive capacity "off the ground". This developing industry provided a marketplace for our agricultural production while assisting us in our energy needs to fuel our vehicles. Incentives are nothing new in fledgling industry development and can be accommodated when the over-all benefits, such as employment, capital investment, tax base development and all the spinoffs and roll-overs that such dollar development produces are considered. This industry also was a response to the need for further market opportunities for our grain growth which was severely impacted when a Russian grain embargo was imposed some years back, and which shifted those sales to other nations. The current strength of the Dollar abroad compounds the ability to export our surplus agri-products.

Another factor which must be considered in any discussion such as we are having today is our traditional use of user taxes to fund our highways. Whenever there is a disruption in the flow of those dollars there is a corresponding adverse effect on road construction and maintenance. To restore such money results in an increase in the taxes on each taxable gallon of fuel consumed, motor vehicle excise taxes, motor vehicle related license fees and all the others that are connected with our highway transport system. Diversions of those funds from highway use is also a problem particularly on the federal level. The diversion of one cent for mass transit in 1983 cost the Highway Trust Fund 522 million dollars. In 1984 that number will reach 1.5 billion.

A.C.I. and the Highway Users Conference does not in anyway disapprove of any meaningful efforts to expand our New Mexico economic base. Our true concern lies in the problems created long term for that expansion which could hurt the existing refining industry of our state with their large capital investment and employment base. Separate statements from Navajo and Plateau have been submitted and they speak to that issue in detail for the enlightenment of the

committee.

To expand further on our concerns, New Mexico's great reliance on highway transportation would be adversely affected if we cannot meet the financial requirements to replace, repair, reconstruct and resurface our roads in all our systems. It is fairly estimated that in excess of 90% of all our existing industry requirements, including retail, are provided by motor transport. Such a large percentage demonstrates our needs for a highway system that is adequate just to serve current demands not including possible expansions demanding even larger volumes. Any erosion of the funds needed to maintain and construct these arteries of vital needs must cause us concern. It is estimated that the additional one-cent gasohol tax exemption through FY1989 will mean a loss of 343 million in federal highway revenues.

To summarize our position:

1) Developmental assistance to the current ethanol industry is not objectionable in its present status.

2) Extensions beyond current levels are objected to because of the burden shift of highway costs to other highway users who cannot take advantage of such a program.

3) To reduce production of gasoline from our New Mexico refiners would cause serious financial impacts with possible closing of some installations.

4) Highway funding needs are increasing each year and traditional user fees cannot replace lost revenues without major tax increases to be borne by those unable or unwilling to use ethanol fuels.

5) Costs of travelling on deteriorating highways include such items as wheel balancing, steering alignment, tire wear which in the case of New Mexico and its industry reliance on motor transport will result in increased freight costs to be paid by the consumer of such goods. Safety considerations are also of concern with exposure to such deficiencies as narrow traffic lanes and unsafe bridges.

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6) Current federal and state incentives are more than adequate to assist the development of the ethanol industry and many producers are operating at a profit with no state incentives.

7) Newly developed refining strategies such at MTBE are viable alternatives in the production of lead free gasoline and have no incentives.

8) If federal and state incentives amounting to highway funding losses of over 391 million dollars in 1983 are to continue, we urge that the Congress and state legislatures consider substituting general fund revenues for such development rather than highway funds.

Mr. SKEEN. Thank you very much, Doc.

Let's get quickly into the questions here. Our time is getting short and these two gentlemen have to leave at quarter of.

Mr. DURBIN. Mr. Forcier, did you ever in the course of evaluating the ethanol industry, did you ever make a comparable analysis of the tax benefits, direct and indirect, which we give in this country to the petroleum industry? We did add a selection on that to make it clear that the ethanol industry is not the only one that receives assistance from the Federal Treasury.

Did you reach any conclusions as to what the comparable price of gasoline would be without Federal assistance today if we compare the present subsidized State to the price structure as opposed to what it would be without subsidy?

Mr. FORCIER. I don't think we had that figure in our report but we did reach the conclusion, alluded to by one of the other panel members, that certainly the conventional oil and gas industry has been the recipient of Federal assistance for many, many years and in amounts much larger than what we are seeing with the ethanol industry. Certainly that is the case, and that is expected to continue for many years. Their assistance is in the form of percentage depletion allowances and the expenses of investments for oil and gas drilling.

Mr. DURBIN. Mr. Weiler, I take it you are speaking for some group that is interested in preserving the highway fund for the repair of New Mexico highways?

Mr. WEILER. Yes, sir.

Mr. DURBIN. What group would that be?

Mr. WEILER. That is the New Mexico Highway Users Conference.

Mr. DURBIN. Do they have any position on the phaseout of lead from gasoline?

Mr. WEILER. Not since any regulations are forthcoming. I would anticipate that there would be come modification of position. However, I think that it goes without saying that the strength of the EPA is going to be flexed very definitely and we are going to see a total phaseout of lead and I think we are going to have to support it.

Mr. DURBIN. Do you know if your organization took any position on the earlier Federal legislation again and did phaseout in the movement of unleaded gasoline to new automobiles?

Mr. WEILER. I am not aware of an official position in that area. No, I am not.

Mr. DURBIN. Thank you very much.

Mr. SKEEN. Thank you, Congressman Durbin.

And Congressman Sensenbrenner. I have to explain the Congressman had a very serious accident not too long ago. His house caught fire in Washington and he was forced to jump from the second floor, so he is very uncomfortable sitting for a while. You will have to excuse him. He likes to wander around because it is very painful for him and we appreciate his being here. If he wants to come back in and ask a question he will do so.

I would like to start now quickly. I have listened to the various panels talk and there is one element that we have not really covered, and that is the import fees that are assessed against the imported ethanol into this country, which I am led to believe is an

extensive part of our marketing in that particular area. We do import a large amount of ethanol from countries such as Brazil that have a big production of this particular commodity.

These import fees were increased recently. Does that have any noticable, or is that an appreciated effect insofar as the marketing situation on ethanol as it relates to domestic production? Let me ask this young man right here to answer that.

Mr. ROBINSON. When the exemption increases to 60 cents per gallon of ethanol.

Mr. SKEEN. What is the level now?

Mr. ROBINSON. Fifty cents per gallon. The Deficit Reduction Act increases it to 60 cents effective January 1. At that same time, to offset and prevent the Brazilians from in fact taking advantage of the American tax cut, there is a compensating ethanol import tariff equalling that amount. So it is 60 cents.

The Brazilians claim that that extra 10 cents essentially pushes them out of the American market. We have not done any analysis to confirm or reject that claim but based on their assessment of their production costs versus their potential marketing price that they could enter into the United States. They claim that they will be out of the U.S. ethanol market by January 1.

I should add one thing. I believe that in the Caribbean Initiative it essentially exempts countries in that region from this import tariff. I don't believe any of those nations are producing in great quantities yet.

Mr. SKEEN. Mr. O'Neill, you said in your statement that New Mexico may not be in a position soon to maintain the level of tax incentives that you have now in the statute. What is the present position of the administration? Are they going to support his? Are they not supporting the tax incentives? Would you give me some idea?

Mr. O'NEILL. Well, Mr. Chairman, yes, sir; I will, although I may be speaking for the Governor without his specific consent.

Mr. SKEEN. You want to characterize this as being your opinion of what the Governor's position is?

Mr. O'NEILL. I think his position since January or actually last November when he had discussions with various members of the ethanol industry and legislators from the area, who were concerned and so on, that he does support the ethanol industry.

The reason why I put that in there is that given the fact that it does take a lot of money out of the road fund without some sort of mitigating mechanism to reduce the impact on the road fund, our effort in that area is going to have to decrease quite a bit. Now, I don't know how much driving you and some of your fellow members of the panel have done on the New Mexico roads, but we do need some work.

Mr. SKEEN. That is historically a chronic situation.

Mr. O'NEILL. Yes, sir.

Mr. Chairman, going on, one of the other solutions that has been alluded to by a couple of the various panels here is to switch money from general fund sources. The State of New Mexico the last couple of years has not had a super-abundance of general fund sources. We have had tax increases and budget cuts and so on to

keep alive the general fund, and it doesn't look like in the future there is going to be any great general surplus to move over there.

So if the law, as it currently stands, does start phasing out—as Senator Chandler's bill now stands—then I think we are probably OK. We can get over that hump for a couple of years. If it gets extended too much further at the same levels that it is now, I don't know if the State can afford it.

Mr. SKEEN. It depends on the total revenue sources, the general funds?

Mr. O'NEILL. Yes, sir. There is a little dark cloud in the background, too, as was mentioned I think by Mr. Clark, that we do have a flow import rule. We don't give credit to the imported ethanol. If somebody sued us, we are not sure what a Federal court would think of that.

Mr. SKEEN. We will have the makings of another El Paso ethanol suit or something of that type. I understand that is your opinion of it, but right now, as I understand your response, that the administration does support the incentives as they are in the law now?

Mr. O'NEILL. Yes, sir; and to be specific—and this is my opinion now—I don't think there is going to be any move by the executive to change any laws.

Mr. SKEEN. Senator Chandler, in your statement you State the need for the creation of national uniform incentive level for alcohol fuels and that it would be sufficient to allow the termination essentially of State incentives, and it is important I think that we have a uniformity nationwide because of the very thing that you, as you just alluded to, the process of attracting ethanol importation from other States because of the attractive tax incentive that we have here.

Would it be more appropriate in your opinion if both the Federal and State Governments shared the costs of the incentives or came up with some idea——

Mr. CHANDLER. Well, I think that is appropriate obviously, with me sponsoring the incentive that we have now. However, some of the problems that have been alluded to by the panelist members—the shortage of funds in the highway department—could be alleviated if the Federal Government were to take that program over.

I wasn't in the hearing during all of Representative Pattison's testimony, but I know he and I have discussed this a lot—and Representative Pattison is much more knowledgeable on this than I—but from the work that we have done, looking at it with all the incentive being increased from the Federal level, a lot of money can be saved from farm subsidy programs by putting that into the ethanol market and using that product rather than a lot of other farm subsidies that we have.

So I think, although it is appropriate that we share that responsibility, if it were a national program with a 9-cent incentive from the Federal level, I think that the industry would be far ahead of what it is now and that the Nation would be enhanced.

Mr. SKEEN. I think probably it would firm up the investment base and some of the other things, and I think that Congressman Durbin's bill seeks to do that. This is an extremely difficult thing to sell to the Congress and I think that we all recognize that.

I want to thank you all.

Congressman Sensenbrenner, I explained to them our problem, that you have to move around and get the kinks out of your back.

Mr. SENSENBRENNER. I have no questions.

Mr. SKEEN. Thank you all very much. Unless there are any questions, I want to tell you how much we really appreciate you folks being here, and we will go on to panel No. 4.

Mr. Reno Zanussi from Grain Power Ltd; Mr. Gary Bunger of Clovis; and Mr. Leland Tillman of Eastern Plains Council of Governments, Curry County.

I want to thank Congressmen Durbin and Sensenbrenner for coming to Clovis, NM. These folks here appreciated having you here and have a safe trip.

Time gets to be a real factor in moving Members of Congress around. This is not a plea for sympathy or for mercy—either one, but we do certainly appreciate them taking the time.

Welcome to the panel. Let's begin with you, Mr. Zanussi, and thank you for being here.

STATEMENTS OF RENO ZANUSSI, GRAIN POWER LTD.; GARY BUNGER, CLOVIS, NM; AND LELAND TILLMAN, DIRECTOR, EASTERN PLAINS COUNCIL OF GOVERNMENTS

Mr. ZANUSSI. Thank you, Mr. Chairman.

I wanted to give you an overview of the Grain Power, Ltd. plant and its operation problems since its inception. Grain Power, Inc. was formed as a partnership in 1980 and signed a contract with a prominent design and engineering and construction company to build our facility in Tucumcari. Construction started in March 1982 and the mechanical completion was accepted in December 1982.

Startup operations were commenced before the end of that year and since this was a prototype plant with a lot of prototype equipment, operational status was actually delayed until July 1983, due to repeated failure of a certain key piece of equipment in the plant, which was called a mechanical vapor compressor. This was essentially the heart of the plant and without it, it could not operate. Since we did not have an alternative to this compressor we did not realize any operations or any revenue for the first almost 8 months of the plant's life.

It was only due to a well planned working capital arrangement that our new facility was able to survive its infancy until such time as the alternative thermal compression system could be installed. Although it was installed, it used a much higher energy in the form of steam to operate it.

From July 1983 until February of this year, with very slow amounts of steam generating capacity for the unit and in addition, repeated attempts and failures of the original mechanical compressor, our production was held down to an average of 20 to 25 percent of our design capacity, and even at that time, waste water disposal problems began to come to the forefront.

In February of this year we installed additional steam generating capacity to allow us to operate at a much higher level. We did take a quantum jump in February when the new boiler was installed—from 25 to 65 percent of design capacity—and stayed at that level approximately through June of this year.

Although we did at times achieve and stay at 100 percent rates for short periods, a higher production average was restricted because of the wastewater restrictions which were imposed by the State of New Mexico Environmental Improvement Division, EID, and the Tucumcari Secondary Treatment Plant.

In July 1984 we were further reduced in our effluent to the city when they in turn were placed under an administrative order by the EPA to come to compliance with their law. So at this point in time, the production we have will probably stay in effect until we complete construction and equalization of the storage unit and obtain approval of the application system from EID.

This wastewater plan is currently under review by EID and is subject to public hearings, but we expect approval and implementation of this plan and we will get up to full production without restrictions caused by the waste water disposal.

Our environmental problems are not ones which are restricted to Grain Power but also have been experienced by all ethanol producers in the State. When each of us came into the State with our plans, none of us really envisioned or expected the environmental problems which we would encounter. I think by the same token, the EID had no information on the industry, nor any guidelines by which to measure the impact of the industry. The initial result, when all the problems began to emerge, was a feeling of antagonism and a lack of communication between our two associations.

However, at the instigation of the ethanol producers, we did meet with EID, the Secretary of Health and Environment, the task force and technical group established to look at all of our problems, and as a result I think at the present time we have an excellent spirit of cooperation and we would expect that our problems will all be resolved and will continue to be resolved, for the protection of our environment and the industry.

Turning to the agricultural aspect of our industry. At Grain Power at full production, we will utilize 70 million pounds of milo annually to produce 3 million gallons of ethanol.

Last year Quay County, which is the county in which we are located and in which we are the only ethanol facility, harvested approximately 22 million pounds of milo with half the land lying idle through Government programs. Although at that time we harvested only about a quarter of our production capacity, we acquired almost half of the output in the State at that time, of about 10 million pounds from local growers at prices significantly higher than were being paid by elevators. This year, we expect a much larger crop to be harvested and we again expect to purchase the bulk of this milo.

If the idle land could be freed from constraints and allowed to enter the free market economy, we at Grain Power could supply ourself, we feel, almost entirely from milo grown in Quay County and give a tremendous boost to our local farmers and farm economy.

Similarly, on a national scale, the large surpluses of grain generated by our efficient farmers over the years have resulted in the development of surplus government programs like PIK, aimed at reducing these surpluses by paying the farmer to keep the land idle. While these programs did reduce the surpluses to some extent,

they also caused the taxpayer to pay out of his own pocket to produce nothing, as well as the loss of a great many agricultural and agriculture related jobs.

The efficiency of our farmers is due, to large extent, to the expenditure over the years of millions of dollars by the government in agricultural research, but no like policy exists to take advantage of full production economy on the farm. By supporting a continued growth of a healthy fuel alcohol industry, which has proven its ability to reduce farm surpluses, the Government has a real opportunity to help develop a full production and agricultural economy and provide an increasingly stable and permanent market for U.S. agricultural products.

In addition to expanding domestic outlets for farm commodities and moving toward a full agricultural economy, the Government could also obtain extra benefits by helping to feed the world's population while reducing our balance of payments. For every gallon of alcohol that is produced, 4.8 pounds of a very nutritional material is also obtained. This is very rich in protein, fat, and fiber. It contains all of the minerals and vitamins possessed in the original grain. Only the starch has been removed to make the ethanol. At the present time in the United States this material is used primarily as an animal feed chiefly in dairy and feed lot operations, but one of its primary potential uses, which you have heard so much of today, is to export to protein poor populations around the world for human consumption as well as our own domestic market.

On the tax incentives issue, as you have heard, New Mexico provides one of the best incentives of any State in the country. This was passed, of course to attract the ethanol industry into the State in search of economic development. These tax incentives are the reason here rather than in some other State. They gave us the best opportunity to pay off our invested costs and our debt service and allow us to stand on our own two feet before they phased out.

In addition, they also allowed the consumer to purchase a superior, high quality, high octane fuel at a price equal to or lower than our regular grades of gasoline.

However, in 1983, while only a few plants were operational and high levels of production had not yet been achieved, events were set in motion by several State legislators to rescind the tax incentives or to escalate the phaseout. These measures were defeated this past year under the leadership of key eastern New Mexico legislators and the Governor's declared support of the ethanol industry and the retention of the status quo.

Regardless of this apparent victory over setback on removing the incentives, we did allow a few potential investors and producers who were sufficiently concerned to just remove themselves from the scene until they could more fully assess the intentions of the legislature.

We were essentially informed, through public comments and television interviews of the legislators, that they are more determined than ever to halt or severely curtail the incentives and thereby to cripple the industry before it can grow into maturity.

The recent increase in the Federal tax exemption from 5 to 6 cents effective January 1 of next year will result in an offset in the State tax from 11 to 10 cents and this, of course, we have no argu-

ment with. In fact, we argued that in the overall U.S. interest to establish national policy of maintaining a 9-cent incentive to provide stability to the ethanol industry and to allow the States to terminate or to reduce the current arrangement of States to specific incentives.

On the national security issue, ethanol is currently being promoted as a superior octane enhancer and this is chiefly responsible for the extraordinary increase of production and use of ethanol fuels. Of course, it was only in recent years—during the 1978–79 crisis, followed by the Iranian crisis—that the fuel ethanol industry was effectively started and ethanol at that time was looked upon as a fuel extender more than as a fuel enhancer. The American people, during any crisis, have always risen to the occasion. It has delved into research and development. It has initiated new industry and it has arrived at solutions.

On the other side of the coin, once the immediate crisis has passed, the American people have also had a penchant for forgetting and for returning in some measure to its old ways.

In this particular instance, the American public has not completely let this go by. They have become more energy conscious. They are turning down their heat at night and air conditioners. They have largely embraced the concept of smaller, more fuel efficient autos, but it has also largely dismissed the notion that a true oil shortage existed and it largely abandoned research and development, which is the lifeblood of any industry or enterprise. The long lines of U.S. motorists waiting anxiously at service stations to purchase fuel have now disappeared and have been just completely forgotten.

However, it is my opinion that the specter of oil shortages has receded into the background, but it is still there and it is waiting to surface again in a few short years and perhaps even earlier, especially since we have instability in the Middle East and potential closing of the Strait of Hormuz.

Therefore, I believe now is the time to expend our efforts in developing a strategic fuel alcohol reserve that would be comparable to the strategic petroleum reserve. We need to underscore the need to have each of these reserves. The United States must have the ability to rely on domestic energy resources in the event of disruptions.

The environmental impact, much has been said about that already. I just want to emphasize once more the importance of fuel ethanol in giving off fewer emissions of hydrocarbons and carbon monoxide than does gasoline and that it will make a very large contribution nationwide toward the creation of a safer environment than we have at the present time.

Some talk has also been given here about ethanol as an industry. In addition to providing an expanded stable market to U.S. agricultural products, has also stimulated increased economic activity and created new jobs in many other areas, such as construction, housing, real estate, construction equipment manufacturing and parts supplies, to name a few. It has been estimated that a new job is created for every 100,000 gallons of ethanol produced, and that $4 in economic activity is generated for each gallon of ethanol produced.

I would just like to summarize this talk by reemphasizing that the fuel ethanol industry is a viable, burgeoning new industry in the American economy, not only in New Mexico, and it has the potential for shifting agricultural price support industry to a full production and free market economy; of significantly contributing to national security by reducing dependency on foreign oil; helping to improve air quality in our environment and spurring greater economic activity in jobs than other areas of the economy.

For these reasons, this industry should be developed or should be nurtured by a national policy providing incentives for development and to ease the burden on the States.

Thank you very much.

[The prepared statement of Mr. Zanussi follows:]

August 14, 1984

Testimony presented before joint hearing

of

Subcommittee on Investigations and Oversight

Committee on Science and Technology

and

Subcommittee on Wheat, Soybeans, and Feed Grains

Committee on Agriculture

by

Reno J. Zanussi

Vice President of Operations
Grain Power - Tucumcari Ltd.
Tucumcari, N.M.

OVERVIEW OF GRAIN POWER - TUCUMCARI LIMITED OPERATIONS

Grain Power, Inc. was formed as an Oklahoma limited partnership in 1980 to develop and construct an ethanol plant in New Mexico. A contract was signed in August, 1981 with a prominent design engineering and construction company in Tyler, Texas to construct the plant in Tucumcari after negotiations were concluded with active city officals anxious to have the facility locate in the city. The name of this plant was Grain Power - Tucumcari Limited (GP-TL) with the partnership plan being that, after startup and successful achievement of 100% sustained capacity, similar facilities would be constructed and scattered around New Mexico. Plant construction was started in March, 1982 with anticipated completion by October 1982. Mechanical completion was actually achieved in December 1982 with startup operations commencing before the end of the year. Since this was a prototype plant with prototype equipment, operational status was delayed until July, 1983 due to repeated failure of a mechanical vapor compressor (MVR) which was essentially the heart of the plant. Without an alternative unit to take the place of this MVR, no real operations and no revenues were realized for the first 7 months of the plant's life. It was only due to a well-planned working capital arrangement that this new facility was able to survive its infancy until such time as an alternative thermal compression system (TVR) was installed to circumvent the shortcomings of the MVR, although it was at the expense of higher energy requirements for operations. From July, 1983, until February, 1984 with very limited steam generating capacity for the TVR operation and repeated MVR failures, production was held down to an average 20-25% of design capacity and waste water disposal problems began to come to the forefront. In February 1984 following installation of a new boiler by GP-TL for increased steam capacity, production took a quantum jump to an average production of 60-65% of design capacity and stayed at that level through June 1984. Although at times 100% production rates were achieved, a higher production average was restricted because of waste water effluent restrict-

ions imposed by New Mexico Environmental Improvement Division (EID) and the Tucumcari Secondary Treatment Plant (TSTP). In July 1984 further effluent restrictions were imposed by the TSTP when they were placed under an administrative order from EPA to come into compliance with their own outfall. This current level of production may continue until a lagoon equalization/storage system and a land application plan, under current review by EID and subject to public hearings, can be approved by EID no earlier than the end of October 1984 and implemented by the end of November 1984. It is expected that upon approval and implementation of the land application plan, full production can be attained without restrictions caused by waste water disposal. The environmental problems which we have experienced are of course not restricted to GP-TL but are also being experienced by all ethanol producers in the State. When each of us came into the State with our own sets of design and operational plans, none of us envisioned nor expected, the environmental problems which we encountered. By the same token, the State EID had no guidelines nor any background information by which to measure this entirely new industry. The initial result, when problems began to emerge, was a feeling of antagonism between the two bodies and a lack of communication. These were overcome when the ethanol producers requested a joint meeting and, through the offices of the NM Secretary of Health and Environment, a task force and technical group was established to discuss and resolve the problems and concerns of both producers and EID. A spirit of cooperation and good will now exists and many problems have already been resolved and we fully expect will continue to be resolved for the protection of the environment and the well-being of the industry.

AGRICULTURE

At full production, GP-TL will use 70 million pounds of milo annually in producing

3 million gallons of ethanol. Last year Quay County, the county in which GP-TL is located and in which we are the only ethanol facility, harvested approximately 22 million pounds of milo with half the land lying idle through government programs. Although we were only at about one-quarter of our production capacity at harvest time, we acquired almost 10 million pounds from local farmers at prices significantly higher than were being paid by elevators. This year we expect a much larger crop to be harvested and we again expect to purchase the bulk of this grain. If the idle land could be freed from constraints and allowed to enter the free market economy, GP-TL could supply itself almost entirely from grain grown in Quay County and give a tremendous boost to the local farmers and farm economy. Similarly on a national scale, the large surpluses of grain generated by our efficient farmers resulted in the development of various government programs, like PIK, aimed at reducing these surpluses by paying farmers to keep land idle. While these programs did reduce the surpluses to some extent, they also caused the taxpayer to pay out of his own pocket to produce nothing, as well as the loss of a great many agriculture and agriculture-related jobs. The efficiency of our farmers is due to a large extent to the expenditure over the years of millions of dollars by the government in agriculture research, but no similar policy exists to take advantage of full productivity. By supporting a continued growth of a healthy fuel alcohol energy industry, which has proven its ability to reduce farm surpluses, the government has a real opportunity to help develop an increasingly stable and permanent market for US agricultural products.

In addition to expanding domestic outlets for farm commodities and moving towards a full production agricultural economy, the government could also obtain benefits by helping to feed the world's population while reducing our balance of payments deficit. For every gallon of ethanol produced, 6.8 pounds of a very nutritional co-product is also obtained. This co-product is very rich in protein, fat, and fiber; it contains

all of the minerals and vitamins it possessed in the original grain; only the starch has been removed to produce ethanol. At the present time in the US, this by-product is used primarily as an animal feed chiefly in dairy and feedlot operations, but one of its primary potential uses would be for export to protein-poor populations around the world for human consumption. The old "food versus fuel" controversy is non-existent because the nutritional components of greatest need have been retained and can be redirected into the food chain.

TAX INCENTIVES

New Mexico provides one of the best tax incentives of any state in the country at 11¢ per blended gallon and was designed to run until 1987 when it would start to phase out over a four year period. This was passed in the state legislature several years ago to attract the ethanol industry into the state in the search for economic development. The tax incentives are of course the reason we are here rather than in some other state; they give us the best opportunity to pay off our investment costs and debt service and allow us to stand on our own two feet before they are phased out. In addition, they also allow the consumer to purchase a superior high quality, high octane blended fuel at a price equal to or lower than the regular grades of gasoline. However, in 1983, while only several plants were operational and meaningful levels of production had not yet been achieved, events were set in motion by several state legislators to rescind the tax incentives or to escalate the phase-out in this year's session. These measures were defeated this year under the leadership of key Eastern New Mexico legislators and the Governors' declared support of the ethanol industry and retention of the status quo. Regardless of this apparent victory for the ethanol industry, several potential investors and producers were sufficiently concerned to back off from coming into the State until they could more fully assess the fickleness and intentions of the legislature. We have since been informed through public comments and television inter-

views of these same legislators that they are returning in the next session more determined than ever to halt or to severely curtail the incentives and thereby cripple the industry before it can grow into maturity.

The recent increase in the federal tax exemption from 5 cents to 6 cents, effective January 1, 1985, will result in a certain offset reduction in the state exemption from 11¢ to 10¢ and we have no argument whatsoever against doing this. In fact, I would argue that it is in the overall US interest to establish a national policy of maintaining a 9 cent incentive to provide stability for the ethanol industry and to move toward a full production farm economy, and to allow the states to terminate or reduce the current arrangement of state-specific incentives without diminishing the present incentive level.

NATIONAL SECURITY

Ethanol is currently being promoted as a superior octane enhancer and this is chiefly responsible for the extraordinary increase in production and use of ethanol blended fuels. It was only in the recent past, however, during the 1978-79 energy crisis followed by the Iranian crisis, that the fuel ethanol industry was effectively started and ethanol was looked upon as a fuel extender on a one-to-one basis with imported oil. The American public, during any crisis has always risen to the occasion; it has delved into research and development, has initiated new industry, has arrived at solutions. On the other side of the coin, once the immediate crisis has passed, the American public has also had a penchant for forgetting and for returning to its old ways. In this particular instance, the American public has not completely forgotten past events; it has become more energy conscious; it has largely embraced the concept of smaller, more fuel efficient automobiles. But it has also largely dismissed the notion that a true oil shortage exists or has ever existed, and it has largely abandoned the research and

development which is the life-blood of any enterprise or industry. The long lines of US motorists waiting anxiously at service stations to purchase fuel have now disappeared and have been forgotten. The spectre of oil shortages has receded into the background but is still there, waiting to surface again in a few short years and perhaps even sooner, given the instability of the Middle East and the potential closing of the Strait of Hormuz.

Now is the time to expend our efforts in developing a Strategic Fuel Alcohol Reserve (SFAR) comparable to the Strategic Petroleum Reserve (SPR). We need to underscore the need for both of these reserves. The US must have the ability to rely on domestic energy resources in the event of disruptions. Even with the Strategic Petroleum Reserve, with 90 days supply of 750 million barrels, oil consumption would probably be cut back to a paralyzing flow. An equivalent dispersed fuel ethanol reserve would do much to soften the impact of such an interruption, particularly in rural areas where distribution would be most difficult.

The national security threat imposed by dependence on foreign oil can also be measured in dollars. In 1983 the bill for imported oil was in the order of $54 billion, and in 1984 it will be of the same order of magnitude. This is money that can be better utilized in this country to stimulate investment, develop industry and farming, and create new jobs.

ENVIRONMENTAL AIR IMPACT

The recent EPA announcement of removing lead from 90% of gasoline by 1986 makes ethanol a logical choice to replace lead as an octane booster. Ethanol also provides a double benefit of even greater importance in that ethanol blended fuel produces fewer emissions of hydrocarbons and carbon monoxide than does unleaded gasoline, and thus makes a large contribution towards a cleaner and safer environment.

ETHANOL AS A "VALUE-ADDED" INDUSTRY

In addition to providing an expanded, permanent, and stable market for US agricultural products, the ethanol industry also stimulates increased economic activity and creates new jobs in many other areas, such as construction, housing, real estate, trucking, equipment manufacturing and parts supplies, to name only a few. It has been estimated that a new job is created for each 100,000 gallons of ethanol production and that $4 in new economic activity is generated for each gallon of ethanol produced. A striking report developed by Employment Research Associates of Michigan projected almost a million jobs from construction and operation of plants in a $12 billion, 6 billion gallon fuel alcohol industry, and that this investment would result in annual savings of $9.6 billion due to "backing out" of foreign oil imports.

CONCLUSION

The fuel ethanol industry is a viable, burgeoning new industry in the American economy and has the potential of shifting agriculture from a price support, deficiency payment industry to a full production free market economy, of significantly contributing to national security by reducing dependence on foreign oil, of helping to improve air quality in our environment, and of spurring greater economic activity and jobs in other segments of the exonomy. For these reasons this industry should be nurtured by a national policy to provide incentives for its development and to ease the burden from the states.

Mr. SKEEN. Thank you very much, Mr. Zanussi.

We would like to hear now from Mr. Gary Bunger.

Welcome. It is nice to have you. Do we have a prepared statement from you, Mr. Bunger?

Mr. BUNGER. Yes, sir.

Mr. SKEEN. Fine.

Mr. BUNGER. I was invited to speak to you on behalf of some of the cattle feeders and dairymen in this matter. I represent two companies, Bunger Construction Co., which is a construction company building feedlots throughout the country. We have been in the feedlot construction for 10 years. We are the largest construction company of this type in the country.

We have built about 2½ million head of cattle pens throughout 27 States. We have worked in Canada, Mexico, Australia, doing the same thing in those areas.

Here in New Mexico, there is very little feedlot industry anymore. Ninety-five percent of all of our work is all out of State. We have been asked by several of the different agriculture companies in the last few years to do studies looking at the ethanol production, that they would like to have the feed from the alcohol plants or own the plants themselves.

Without the tax-incentive programs, we haven't been able to justify any of our customers owning alcohol plants. This has been in Nebraska, Colorado, Kansas, quite a few areas with large grain production.

The other company that we have is Western Feeds. It is a fairly new company here in New Mexico. A year ago we contracted with the midwestern companies to take the output of three of their alcohol plants for the stillage. We built a separator. We put in some cattle pens of our own out here and put our own cattle in the facility. We built a separator. We sell the feed to other feedlots and other dairies. We own a dairy south of town ourself and also.

The feed produced by 1-million-gallon plant will feed approximately 4,000 to 5,000 head of cattle based on using a separator that brings it down to approximately a 70 percent moisture content on this.

The byproduct from these alcohol plants, some of them call it byproduct. We consider it a main product. It is stillage, 97 percent water and 3 percent solids as it comes from the alcohol plant. We run it though a separator that does then pour off water. We use this water to water our cattle. We irrigate with it. We use it as a fertilizer on our fields.

The EPA, we are having a little disagreement as to whether it is fertilizer or whether it is waste material, but we think of it as fertilizer.

The material that we are using for feed in there right now we are analyzing it at about 32 percent protein on a dry matter basis. Normally corn is about 9 to 11 percent protein, but through the process of the fermentation and so forth, the sugars or carbohydrates are taken out of the corn, leaving the protein. This material is very rich for cattle feed. It is actually too rich just by itself.

Here, in New Mexico, and most of all the other States, we had quite a bit of corn stillage. After the harvest, most farmers burn it. We see quite a bit of it in the air during the summertime through

air pollution problems, but by combining this material with this stillage or mass, as we call it, this makes it extremely good.

The stubble is very high in carbon hydrates and has hardly any protein. By combining the two of them makes almost a perfectly balanced cattle ration. The only problem with this is that you can't haul it very far. It is very high in water, and you can't afford to haul the water but about 30 to 40 miles economically to stay on an economic basis.

The mash has a secondary benefit higher than its own protein value in that it is a bypass agent. This is the animal gives a better conversion than what it would normally. We are seeing this in cattle gains that are better than what we would have predicated in our economic studies.

In New Mexico, here the last 10 years ago, we had approximately 25 major feedlots that were over 5,000 head. Today we have less than five major feed lots. We had two large patents that were viable industries. Today we don't have any. The feedlots and dairies are directly affected by the availability and pricing of grain. It takes eight pounds of feed fed to an animal to produce 1 pound of meat again, so they have to be close to their feed source.

We started building feedlots in California 20 years ago. This was a major area where feedlots were situated. After a few years, because they were shipping grain in from Texas and so forth, we ended up building them in Arizona. Arizona we built up to 1 million and a half head of cattle in feedlots. Again, because the grain is not raised in Arizona, people moved the feedlots. Arizona only has a half million of cattle in feedlots.

New Mexico had the cattle-feeding industry for a short while. Then we lost it. The Texas Panhandle area grew 10 years ago to a very large industry. Today grain is being hauled into the Panhandle area. It is a deficit area of grain.

Kansas and Nebraska today are on the growth with their cattle industry. Why are they moving into worse weather? Because they have cheap water and cheap grain.

As our gas prices go up here in New Mexico, our diesel fuel and so forth, the cost of pumping water goes up higher. When that goes up, grain has to go up with it. When grain goes up, the cattle price has got to go up, whether it be right here or in the Panhandle of Texas or Kansas. When the price of cattle goes up, the entire Nation suffers through the cost-of-living increase.

Whenever the cattle go up, either the housewife has got to cut down her consumption or increase her cost of living. Today most people are cutting down on beef.

The next question is why will ethanol plants help this area or change this pattern? Whenever we get the mash, it is so high in protein and combining this with the stubble, we come back down to a more economical base of gains or cost to gain on cattle. People like myself can come in and build smaller feedlots next to these ethanol plants and can go back to smaller operations, come back into areas like New Mexico and become viable, they can compete with the large grain companies or the large multinational companies in the cattle prices.

We are losing thousands of acres of grain due to the farms collapsing at this time. Giving them a market where they aren't total-

ly dependent on Government subsidy programs, PIK, different things like this, they can produce more grain. We can consume it in the alcohol plants, and also the cattle operations will come back there to being in this area.

What is the future without the tax incentives? Whenever you go further North, the cost to build these facilities, we just completed a 100,000-head facility under roof. It cost five times as much to build this facility as it does to build a feedlot in the Panhandle of Texas or New Mexico. This has to be passed on to the consumer.

Even some of the other countries we have been in, Australia, they are looking at the pattern they see here in the United States. They are predicating a lot of their growth on our inability to raise grain and produce cattle. I think most of the people in this area are totally dependent on agricultural resources. Whenever cattle go down, grain has to suffer, other suppliers, secondary producers of machinery, of services in a community like Clovis are directly affected.

With a tax incentive program to help the ethanol producers, we see more dairies coming in. We have a large dairy market developing in Dallas and Houston. They can't produce milk down there. We can produce milk here. Quite a few dairymen are looking at the Clovis Area right now, and if it continues to grow, we will see quite a bit more dairy activity. This creates more jobs, more flow of cash to the farmers and to the community.

Grain prices, farmers aren't totally dependent on the Government for this. Cattle prices aren't dependent. We can hold the prices stable on cattle and go out to some of the foreign markets because we aren't priced totally out of the marketplace. Small cattle operations instead of talking 100,000-head operations, small 1,000- to 5,000-head operations can become economical gain. Packing plants will be coming back into this area.

In New Mexico, we can see quite a bit of increase in cattle feed. This would increase the activity in some parts around this area, packing plants, stabilizing our agricultural community and decreasing some of our unemployment.

Nationally, we work throughout the country with other cattle-feed lots. They are looking at the same problems that we are here in New Mexico, how to stabilize and stay in competition to the large organizations. Their communities are totally dependent on the feedlot industry also. We think that the Government can and should help the ethanol industry for a while to get stabilized.

Thank you.

Mr. SKEEN. Thank you very much, Mr. Bunger

Now, Mr. Tillman.

Mr. TILLMAN. Thank you very much, Mr. Chairman.

I want to thank you and members of the committee for coming to eastern New Mexico with this hearing to discuss these critical issues regarding the future of the ethanol industry in the State of New Mexico. I think that it serves many purposes, including helping us all to recognize the complexity surrounding the debate about the ethanol industry in the United States.

Certainly, it helps all of us understand the critical role that public policy plays and the multiple benefits that the alcohol industry can play with regard to energy, agriculture, environmental and

national security policies that those of you in Congress certainly must be concerned with.

Back in 1978 and 1979 when the grassroots interests in a farm-based ethanol industry was probably at its peak, there were many who developed a policy of cautious optimism, recognizing the substantial opportunity that the alcohol industry had in the State of New Mexico, and the major contributions it could provide in the way of stabilizing markets for agricultural products and very important to the local governments that I worked for in eastern New Mexico in creating decent-paying jobs in the rural communities where these plants would be located.

Local governments have been strong supporters of the ethanol industry in eastern New Mexico, recognizing the expansion of the economic base and the diversification of the economic base that provides in eastern New Mexico. I think New Mexico, in general, is increasingly recognizing its dependence on single sources of revenue, the problems associated with the copper industry, the uranium industry, the coal industry, and other industries in the State certainly points to the need for a diversified economic base.

New Mexico, of course, is dependent upon oil and gas revenues, but I think with a profit in agriculture, we can really shore up the economic situation in the State of New Mexico, and I believe the basic reason the ethanol industry was pursued so vigorously in the State of New Mexico was to provide that stability for farmers to pay out debt and to regain some economic stability with their production.

I would like to make one comment that is not in my prepared statement about the U.S. Department of Agriculture's rural development policy which was just very recently issued to the Congress, and Secretary Brock in that statement indicated that agriculture was critically dependent on rural communities and the jobs in those communities because over half the farms in the United States are now deriving the majority of their income from all farm sources.

Well, this is a disappointment to me because I had always believed that the economy of rural communities hinged on a profitable agricultural base, and I would hope not everyone involved in agriculture in the future will have to do like I have done and take a job in town to maintain a viable agricultural enterprise out in the country.

I think the experience in New Mexico undoubtedly has proved that these types of incentives do work. Public policy short-term in duration along these lines very definitely attract private sector investment. I think one of our problems in the State of New Mexico in maintaining these tax incentives has been we have been penalized for our initial success.

I think the highway department and those concerned with revenues at the State level had a knee jerk reaction when they saw the potential with all the plants that were in operation and all those that were being discussed and proposed were to become in operation, it would have been a formidable challenge to make adjustments to that revenue leakage.

But despite the problems in the ethanol industry in this State, I think we are making very definite progress. I think it is true that

New Mexico is unique in the ethanol industry across the country. You see major facilities, multimillion gallon facilities in other States. Virtually nowhere in the country will you see the kind of development occurring on an appropriate community-size scale where you are closer to your feed lot and your byproduct markets. You are closer to the grains that are being grown for production, and you have a very substantial impact on the local economy of these areas when the production is diversified.

It certainly supports the contention that it strengthens our national security because it diversifies our energy production and gets us away from very vulnerable centralized energy production processes.

As a policy alternative, I think ethanol incentive programs make good sense from almost any vantage point and unlike the PIK Program, paid diversion programs, deficiency payments, reserve programs, the ethanol industry actually creates real new demand for agricultural production.

Unlike lead, ethanol has proven itself as an effective octane enhancer which doesn't pose serious air quality and health risks and unlike some Federal programs like the Synthetic Fuels Corporation, the ethanol industry is basically a proven technology that integrates easily with the existing fuel production and distribution system and unlike foreign oil imports, it provides that decentralized agricultural base renewable fuels industry which is not subject to that disruption and unlike oil and gas or even coal, ethanol is a renewable resource.

One of the things that is occurring in the State of New Mexico despite many of the cutbacks in research and development dollars at the Federal level, there is extensive research occurring at all these facilities. We haven't determined at this point all the answers. I think many of the producers can share their knowledge about things that won't work and are increasingly willing to do so.

We have heard about mountain development plans for good grade distiller dried grains for human consumption. We are trying to work through the problems with thin stillage by having it certified as a soil conditioner, use of methane digester technology, evaluation of alternative feedstocks that will use less water and produce more energy.

Particular emphasis is being placed on technologies that will alleviate our disposal problems. New forms of enzymes, yeast, progress and cellulose conversion and use of biomass in boilers all hold great promise for strengthening the economic viability of the industry in the future. With continued support of the Congress and the State, this industry cannot only survive, but prosper in the years ahead.

I am going to skip over substantial portions here and make one brief comment regarding the revenue losses to the highway department. These losses have been referred to from time to time as devastating. During the legislative session last year, looking at the revenue projections on a multiyear basis, I found it particularly interesting that a highway department budget over a 3-year period approaches a $1 billion figure and just in the annual work program for this year is over $100 million, just in this 1 year.

The doubling of the gas tax last year by the Federal Government generated close to $60 million in additional revenue from the highway department and by me, of my calculations, the approximately $5 million revenue loss today represents only about 2 percent of the total highway department budget.

I would hope that the highway department and the State administration would all work to improve the efficiency in the road department to maybe help mitigate some of these kinds of losses. We do recognize the importance of the highway infrastructure. If there is anything in New Mexico that recognizes the need for better roads, I think all of us up and down the East Side certainly could attest to that fact. It is critical, particularly with transportation of carbon dioxide that is occurring up and down the East side at this point and production of grain and the need for better infrastructure.

I am particularly encouraged by the previous testimony of Mr. Weiler and Mr. O'Neill of the taxation and revenue department. I think they represent the spirit of cooperation that has really led to the development of the industry in New Mexico. That willing-to-work-together attitude and stay committed to the kind of incentive program that New Mexico has proven will work.

The industry has great potential in the State. It needs time. It needs the continued support of Congress in order to attain the agricultural and environmental and energy policy goals. It will take the best of human performance of technological and scientific performance. It needs the unwavering support of the Governor. It needs the unwavering support of the legislature. It needs a receptive refining industry that will share the energy marketplace with the agricultural community and the ethanol industry.

It needs the continuing grassroots support of local governments and local people who work very hard to promote economic development and diversification at this level, and most important of all, in my view, it needs the farmer to continue to stay in business so that this kind of industrial enterprise in agriculture can exist.

I am going to conclude my testimony with an excerpt from a brief quote from the late Everett Dirksen who said, in January 1935:

> Almost 50 years ago now that we must alter our internal economy by processing surplus crops into alcohol to be mixed with gasoline in a proportion of 10 percent. We will be able to establish a balanced agriculture, a balanced industry and preserve for ourselves the greatest market in all the world, namely the market in our own land, for our own people. It is the kind of diversification through which we can preserve eternal prosperity and rid ourselves of a dangerous dependence on other nations.

I think Mr. Dirksen said it well. It is as appropriate today as it was then.

That concludes my comments, and I will be happy to respond, along with other panel members, to questions.

[The prepared statement of Leland D. Tillman follows:]

Statement of

Leland D. Tillman
Executive Director
Eastern Plains Council of Governments

Mr. Chairman, members of the committee, I want to join the many others here today in welcoming you to Clovis and the surrounding area to discuss the critical issues regarding the future of the ethanol industry and public policies needed to foster its' continued development.

I'm pleased to appear before this committee today to share my personal and professional experience in the development of the ethanol industry in New Mexico. Your being here today helps us all recognize the critical role public policy plays in the development of a new industry. It helps underscore the multiple benefits that it brings to communities and the contribution it makes to energy, agriculture, environmental, and national security policies.

Back in 1978-79 when the grassroots demand for a farm-based ethanol industry was at its' peak, many people established a policy of "cautious optimism" about the potential of the fuel ethanol industry in New Mexico. Our research institutions were telling us at that time that it wouldn't work. That it wasn't economically feasible. But there were many others who recognized what an important opportunity the industry represented to help stabilize markets for surplus agricultural products and diversify our economic base. It is a significant departure from previous policies which allowed most of our agricultural and mineral wealth to be shipped out of state for processing and sales.

The local governments I work for in the Eastern Plains area have been particularly supportive of the ethanol industry because it is an appropriate industry which creates jobs and integrates well with the agriculture and livestock production base of the area. New Mexico is very dependent on oil and gas revenues which have been decreasing steadily. The ethanol industry can help diversify our economy by providing a "renewable tax base" after the incentives are phased out. But at this point the industry needs your help just as the petroleum industry needed your help when you established the oil depletion allowance. Without these types of positive incentives, new technologies will not be forthcoming and our energy future will not be as secure.

New Mexico has proven that cooperation between government and the private sector does work. That short-term incentives can and will stimulate private sector investment. When the New Mexico Legislature unanimously approved the graduated phase out of the tax incentives during the 1983 session, the investment community responded by funding the development of the small scale commercial facilities we have in New Mexico today. But all has not gone well for the industry here since then. Some elements of the media seemed determined to discredit the industry by focusing on the questionable activities of a small few. Virtually no exposure was given to the success stories. Those who were dedicated to making the industry work for the right reasons went unmentioned. Then the 1984 Legislature, with lots of help from some of the refineries and highway department interests, began undermining the states economic development credibility by proposing changes in the phase out schedule. These forces combined to give investors second thoughts about the stability of the state incentives. Not only was new development stiffled, but it dealt a crushing blow to a company struggling to overcome technological and financial problems.

Despite the problems plaguing the ethanol industry in New Mexico, I am very optimistic about the future of the industry. Instability in the Middle East, concern about the use of lead in gasoline, concern about air quality in urban areas, and the need for alternative markets for surplus grain all point to the need for policy officials at the state, federal and local level to maintain their support for a viable ethanol industry.

As a policy alternative, the ethanol incentive program makes good sense from almost any vantage point. Unlike PIK, paid diversions, deficiency payments, and reserve programs, the ethanol industry creates real new demand for agricultural production. Unlike lead, ethanol has proven itself an effective octane enhancer which doesn't pose serious air quality and health risks. Unlike the Synthetic Fuels Corporation, the ethanol industry is basically a proven technology which easily integrates into the existing fuel production and distribution system. And unlike foreign oil imports, it provides a decentralized, agricultural-based, renewable fuels industry which is much less vulnerable to disruption. And finally, unlike oil and gas or even coal, ethanol is renewable.

From a technological standpoint, it is important to recognize that the ethanol industry in New Mexico is unique. Unlike the huge wet milling facilities in Illinois, the 1-3 million gallons per year facilities found in New Mexico are plowing new technological ground.

Current research and developments include production of food grade distillers dried grain for human consumption, alternative uses for thin stillage as a soil conditioner, integration of methane digester technology, evaluation of alternative feedstocks such as sweet sorghums, fodder beets and even buffalo gourds. Particular emphasis is being placed on the use of ethanol co-products. Environmentally safe disposal technologies are being vigorously pursued. New forms of enzymes and yeasts, progress in cellulose conversion technology, and use of biomass as a boiler fuel all hold great promise for strenghtening the economic viability of the industry in the future. With continued support, the industry can not only survive but will prosper in the years ahead.

The infant fuel ethanol industry in New Mexico is at a critical development stage. It has experienced significant problems like any new industry. Financial and technological. But the solutions are within reach. Steady progess is being made. The entrance of agriculture into the fuel industry hasn't been easy, but as the ethanol industry matures it will become increasingly recognized as a permanent part of the country's liquid fuel production and distribution system.

The issue of the actual revenue impacts of the ethanol tax incentives in New Mexico is an ongoing debate.

The impact of the industry in New Mexico has been positive from an economic development standpoint. The industry has provided capital investments in excess of $50 million, has created the potential of more than 250 direct jobs, and has created a significant new market for corn, grain sorghum, and wheat grown in the area. If all the facilities currently in place were operating at anywhere near rated capacity, more than 6 million bushels of grain would be needed annually. The upward pressure on grain prices in the area could increase farm income by millions of dollars and reduce farm program deficiency payments to near zero. The high protein by-products from this level of production would weigh more than 50,000 tons and be worth about $7.5 million annually.

On the negative side, the tax incentive is creating a revenue leakage in the highway department. The revenue losses so far have been less than 10 per cent of the total direct capital investment. Some contend that the $5 million or so "invested" in the industry so far has had a devastating effect of the Highway Department budget, please recognize that this figure represents less than 3 percent of the total department budget.

More detailed studies on the short-term and long-term revenue impacts of the ethanol industry in New Mexico will be completed this fall to better quantify the overall impacts on New Mexico's economy.

The ethanol industry in New Mexico has great potential. But it needs time. It needs the continued support of Congress in order to attain our agricultural, environmental, energy, and national security goals. It needs the best of human, sceintific and technological performance. It needs the unwaivering support of the Governor and the New Mexico Legislature. It needs a receptive refining industry willing to share the energy marketplace. It needs the continuing grassroots support from local governments and local people who work hard to promote economic diversification and development. And most importantly it needs the farmer.

I'll conclude my testimony with that except for a brief quote from the late Everett McKinley Dirksen who said in January of 1935, nearly fifty years ago now: "We must alter our internal economy by processing surplus crops into alcohol to be mixed with gasoline in the proportion of 10%.....We will be able to establish a balanced agriculture, a balanced industry, and preserve for ourselves the greatest market in all the world, namely, the market in our own land for our own people. It is a kind of diversification through which we can preserve an eternal prosperity and rid ourselves of a dangerous dependence on other nations."

Thank you Mr. Chairman, members of the committee. My written statement has additional information which may be useful to the committee. I'd be happy to respond to any questions.

BIOGRAPHICAL SUMMARY

OF

Leland D. Tillman, Executive Director
Eastern Plains Council of Governments

Leland Tillman is a native of Eastern New Mexico who, in addition to his responsibilities as executive director of the Eastern Plains Council of Governments, is a dryland wheat farmer.

Lee served on Governor Kings' Alcohol Fuels Task Force in 1980-81 and has been involved in the alcchol fuels promotion and development program in New Mexico from the beginning.

He also serves on the Board of Directors' on the National Association of Development Organizations in Washington and has served three years on the Rural Development Advisory Committee of the National Association of Regional Councils.

As staff for county and municipal governments in Planning District IV, he has been a strong advocate of a viable ethanol industry in New Mexico because of its' positive impact of agriculture and its' potentional for assisting rural communities retain their economic viability. He has served as executive director of the council of governments in this area since 1976.

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Mr. SKEEN. Thank you, Mr. Tillman.

I do have some questions. We will expand it a little. I want to tell all the folks who appeared here today, the folks out here who have been a patient audience here today, I want to give them the opportunity to ask questions if they would like to.

Anyone on the panel, I would like to start off with a question regarding water. Being such an important resource and critical resource for us, particularly how the practices and production and manufacturing affects our water supply. In this instance in the production of ethanol, I would like to ask Mr. Zanussi, Mr. Bunger and Mr. Tillman, what is the situation with regard to water supply, the attainment of water for this distillation process, its recoveries and the improvement of the water itself? Do you have a water recovery system?

I know you talked about it, Mr. Zanussi, about the problems you had, and I appreciate it, and I think you have taken care of it in a great manner, but let's talk about the impact on the water supply of this industry.

Mr. ZANUSSI. At the present time, our plant is utilizing about 100,000 gallons a day of water that we get from both the city and from our own well water supplies.

Mr. SKEEN. Have you had trouble attaining enough water?

Mr. ZANUSSI. No, not in obtaining the water. Our problem is getting rid of the water.

Mr. SKEEN. We have a lot of suggestions on that.

Mr. ZANUSSI. We have a problem with the city of Tucumcari and the EMG because each one wants to handle it with different perimeters, and we have had technical discussions, but the city is very restrictive in what they will accept from us whereas if we go strictly by—the State is the opposite way of the city in terms of what the perimeters of water they will accept are.

Their national concern and ours, of course, is for the ground water. We do not want to hurt that in any way, and we are not doing that. We are following a course of land application and plan to and control the perimeters of water.

Our final plant calls for the disposal of 30 million each year onto the land, and that is a very small proportion of what would be required for crops in our area.

The alfalfa fields to which we want to apply it will take about 3 acre feet per year and all we can supply is one-half an acre foot.

Mr. SKEEN. And that is your affluent for the size plant you have now?

Mr. ZANUSSI. That is correct.

Mr. SKEEN. There is a great possibility with you in an operation like Mr. Bunger's where they are doing commercial feeding or vertically integrating the process at this time where you use the water. I know, Mr. Bunger referred to it in his testimony, that you use some kind of slurry or something that you use for feed.

Do you have a problem with waste as well? It is considered as effluent or is it an ecological problem for you too, from feed lot operation?

Mr. ZANUSSI. Mr. Chairman, our effort is quite a bit different than the plant that was closed in Portales in the sense that we have a different operation in our system. We are taking distillage

that they must dispose of in Clovis and Portales in the areas between this feed lot operation, just missing the other stillage materials. We have 5 to 50 percent solids and we are letting that back into our grain and applying it to 10 percent solids.

So what we get out of our plant really is just water, but it does contain a certain amount of nitrates and chlorides and sulfates, and these are the things that the State is objecting to, which we must stay within certain perimeters. So our water characteristics are quite a bit different.

Mr. SKEEN. I have always been curious about a totally recycled system, if we can ever reach that kind of an optimum. I didn't want to let that kind of opportunity go by to see if we can't engineer these kinds of associations.

Mr. ZANUSSI. Well, if you could make that work, then we will have a large degree of recycling and much of our problem will be dispelled.

Mr. TILLMAN. I would like to try to respond to the question, Mr. Chairman.

I appreciate the question because I think all of us are certainly concerned about the ground water situation from a depletion standpoint, which I think is the initial purpose of your question.

Certainly ethanol production is a water intensive industry. Not nearly so water intensive as irrigated agricultural production itself, however, I do believe that even the current plants that are in operation are making good economic use of the water that is utilized.

Much of the water can be used for irrigation purposes and the value of the water that comes out of these alcohol plants after processing is actually much more valuable for the crops when properly applied in appropriate ratios than the water itself. It does have valuable nutrients.

As far as the integration of facilities, we had an opportunity to visit an alcohol plant located in the middle of a feed lot in Garden City, KS not too long ago. This gentleman takes all of the effluent from his alcohol plants and has actually substituted the stillage or the effluent water for the fresh water in the feed lot, and virtually all of his thin stillage is consumed by the cattle. It does have solubles in the water, and it is a valuable supplement in addition to the dry feed itself.

I think with some of the drying technology and other technology, I envision a time in the not-too-distant future in proposals before the New Mexico Energy Research and Development Institute right now to put in place very soon on an existing facility an apparatus that would essentially take this thin stillage and get it back to the point where it would be used as processed water going back into the original process and really closing the loop on water. I think it is a great opportunity to integrate water utilization, and we have got to get the maximum dollars out of what water we do have.

Mr. SKEEN. Thank you; that is very interesting. What are the transportation problems now associated with stillage, and also what are the costs relative to the transportation and the storage of that stillage, is this a marketing factor?

The question was having to do with the transportation and storage and the associated costs of the stillage.

Mr. Bunger.

Mr. BUNGER. I think some of the plants are handling nonstillage like they do up at Tucumcari. Some of the other plants are selling off their thin stillage and hauling it in trucks. They are hauling it out to some of the feedlots and dairies around here and watering the cattle with this material.

It does help the cattle quite a bit. It has quite a bit of nutrients in it. It is very high in protein. It stimulates their appetite similar to beer.

Mr. SKEEN. Is there a little bit of that alcohol in there?

Mr. BUNGER. Just a little bit. They are happy cattle. It is a very small amount, but the cattle do like it. They go over to it, and a lot of times if they have a choice of fresh water and thin stillage, they will go to the thin stillage and drink it instead.

Mr. SKEEN. Not too different from some folks we know.

Mr. BUNGER. They have had a couple of those spills from the trucks in the town or around the area that is in any transportation industry, and they do have some. I think this has been corrected. Most of the places are handling the stillage plants on their own property or putting it through sprinklers, and so forth.

Mr. SKEEN. Mr. Tillman, I want to ask a question on the industrial revenue bonds, and so forth and what the feeling of it is from associations and concerns such as the Council of Governments. What responsibility do you feel toward proposals that are made by various new investor formations and so on as to their background? Do you think that there is a responsibility somewhere on the local level that should be applied vouching for people who are seeking this kind of help?

Mr. TILLMAN. Well, as you well know, Congressman, industrial revenue bonds have been a significant issue in Washington recently with changes in the industrial development bond statutes.

I will say that the industrial revenue bonds in a rural area are a critical development tool. They are one of the very few ways that a local government can take action to stimulate development. In most cases, if your bond counsel does his homework, there are the kinds of assurances and protections provided to the local governments to issue those industrial revenue bonds.

One of the proposals that was debated in Congress, and I don't think was enacted, discussed the possiblity of a local commitment of some degree. Currently, no dollars need be made by local governments to access industrial revenue bonds. I think the action was taken here in the city of Clovis and in many other communities who utilize industrial revenue bonds to put these bond packages through a fairly extensive local review with local bankers reviewing the package, others interested in the viability of the project reviewing this package.

I think it is important for local governments to recognize they do have some responsibility when they initiate action to get industrial revenue bonds for business, and I think they essentially, to an extent, become a party to this business future. I think more sensitivity on that responsibility on the part of the local governments, they certainly need to be fully aware of what they are involving themselves in.

I wouldn't like to see that imposed statutorily. I think it is the responsibility of the local governments to develop their own procedures for assuring that it is a good investment in the community.

Mr. SKEEN. In connection with that, I think I have heard several comments that that is exactly what the plan is on a local level, to develop the local response or that kind of responsibility. It is also a security mechanism, and I applaud that kind of self-help initiative that has been begun in the State of New Mexico.

That concludes all the questions I have, but I would like to ask staff at the same time and introduce them to you. This is Mr. Bob Nicholas, a representative of the majority staff, and Bob Lamina, on this side.

And my legislative assistant, Mr. John Rasmussen, is my legislative assistant on the Subcommittee on Agriculture. He is a Virginian and there are a lot of New Mexico folks over there and part of our criteria in our office is that they have to travel to New Mexico.

I want to thank you all very, very much for this presentation, and I would like to mention that because we conclude the hearings today, that we still will leave this record open for a period of 2 weeks for the submission of additional statements for the record, and it may include additional questions that would be submitted to you in writing if you feel it is necessary.

So I want you to know the record is staying open, and I also want to thank, in addition, the witnesses and the staff that we have had here for their assistance in setting up this hearing. This has been a very well-orchestrated hearing. It has run very smoothly, and we appreciate the participation.

I am going to give the folks who are sitting out there an opportunity to ask questions. I don't want people going too far, but I want to mention some folks who have been very helpful to us.

Diana Hester, Gordon Thompson, Walter Bradley, Gilbert St. Clair, Dan Davis, Russell Grider, Shelley Johnson who is with the Synergy Diversified Services; Ron Autry whose plant I am going to go take a trip through this afternoon, and I want to thank all those folks and all of you that have participated today.

Do you have any questions that you would like to have or any comments from the folks out here? I see Hoyt shaking his head. Hoyt, I want to thank you and Caleb for the legislative response we have had and the community response we have had to these hearings. I think they have been very productive for us, and I want to thank all of you who have been here today.

I also want to thank the officials of the Clovis Campus of Eastern New Mexico University for the use of these facilities. They have been very accommodating, and we have certainly enjoyed being here with them today.

So, if there are no more comments or questions, Scott, I thank you very much for being here. Thank you all so very much. We appreciate your participation and cooperation. [Applause.]

[Whereupon, at 1 p.m., the subcommittee was adjourned subject to the call of the Chair.]

[Additional material submitted for the record follows:]

PLATEAU, INC.
Position Paper

Plateau, Inc. operates a petroleum refinery at Farmington, New Mexico, and has been in business in New Mexico since 1960. Plateau produces leaded and unleaded gasoline, diesel fuel, liquified petroleum gases, and heavy burner fuel.

It is Plateau's position that the incentives offered the Ethanol Industry, are unfair, outdated, and represent a subsidy to an industry that is financed by taxpayers who in large do not reap the benefits of that endowment.

For example, one of the advantages postulated in the original ethanol incentive program was that the cost of gasoline to consumers would be reduced. That has not happened. Those distributors using ethanol did so to increase profit margins and the consumer never benefited - only the promoters who constructed the plants, the ethanol manufacturers, and the distributors were beneficiaries. The vast majority of taxpayers in New Mexico derived no economic benefit.

There are other disadvantages to state supported ethanol production. The New Mexico road fund, in dire need of revenue, will lose in excess of $20 million when ethanol reaches peak production. This revenue shortfall can only be extracted from the existing petroleum industry, an industry already taxed beyond reason, and an industry currently in decline due to competitive pressure on crude oil and refined products. One of these competitive influences is ethanol production which is replacing gasoline in an already glutted marketplace.

Plateau, Inc. is directly affected by the factors outlined above. Plateau is for sale at this writing. If no buyer is found, the refinery and offices

will be closed. Plateau employs 350 people in New Mexico with an annual payroll of $6,000,000.00. Additionally, Plateau has spent $35 million for construction since 1979 to enable the production of motor fuels to meet production and governmental standards. None of these capital expenditures were subsidized through state or federal governments.

We do not endorse the abolition of the ethanol industry. Rather, it is suggested that commitments made to existing plants and those under construction be upheld. No further incentives however, should be made available to the ethanol industry and those existing incentives should be reduced immediately. New Mexico tax incentives for ethanol are the highest in the nation. Why? Why do our ethanol producers require excessive subsidy? Why have other states abolished or substantially reduced ethanol tax credits? Why do we insist on taxpayer support for a new industry that directly competes with established businesses whose economic impacts in New Mexico far exceed those of the ethanol industry?

Finally, there is absolutely no shortage of either crude or finished products world-wide, nor is there an impending shortage. Consequently, there is no need to provide excessive incentives to a fuel industry that is not needed at present nor in the forseeable future. Under these circumstances, it is incongrous that a home-grown, in-state industry should have to compete for its livelihood with the State of New Mexico and an ethanol industry which cannot stand alone financially.

PLATEAU, INC.

P.O. BOX 26251
ALBUQUERQUE, N.M. 87125-6251
PHONE 505/262-2221

August 10, 1984

H. J. "Doc" Weiler
Association of Commerce & Industry of New Mexico
117 Quincy, N.E.
Albuquerque, New Mexico 87108

Dear Doc,

I have attached a Position Paper for Plateau, Inc. regarding the Ethanol Industry. It would be immensely appreciated if you would present this paper to Representative Skeen and his committee at the Clóvis meeting next week.

The potential decline in revenues for the State of New Mexico must be addressed. The well-being of the State's Petroleum Industry is in the balance. Actions taken with regard to the Ethanol Industry directly affect both problems.

I trust this input will assist the decision-making process.

Sincerely,

Charlie

Charles W. Hooker
Vice President
Marketing

CWH/rde

Plateau

PETROLEUM REFINERS • MARKETERS

LAW OFFICES
LOSEE, CARSON & DICKERSON, P. A.
300 AMERICAN HOME BUILDING
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ARTESIA, NEW MEXICO 88211-0239

A. J. LOSEE
JOEL M. CARSON
CHAD DICKERSON
DAVID R. VANDIVER

AREA CODE 505
746-3508

3 August 1984

The Honorable Joe Skeen
Member of Congress
Federal Building
Roswell, New Mexico 88201

Re: Tax Incentive for Ethanol Producers

Dear Congressman Skeen:

Bill Gray of Navajo Refining Company asked me to reproduce Navajo's Position Paper in opposition to the New Mexico tax incentive program offered to ethanol producers.

Navajo and other local refiners sought to have the ethanol tax benefits phased out faster than had been originally planned or to reduce the credits. The basis for refinery opposition was:

(1) The economics of producing ethanol as a blending stock for gasoline in New Mexico is based entirely on maximizing the use of every tax benefit available, including the federal and state tax gasoline tax deductions. If the ethanol industry in New Mexico had to face a free market, it could not survive.

(2) The method of subsidizing the ethanol industry is unfair. If it is desirable to insure New Mexico farmers with a stable market for their grain, that can be done by guaranteeing them a certain price for their grain. Why should the burden of this program be borne by the highway department?

As some of the refiners (and the New Mexico highway department) pointed out, one can fashion a similar program for any industry. If the government pays the packing house $50.00 for every New Mexico lamb butchered, the incentive can be shared both by the packer and the grower and more sheep will be grown in New Mexico.

(3) The Navajo Position Paper notes that in New Mexico the tax program has a devastating effect on the highway fund. The highways must be maintained. The obvious place to look for the funds is from increased taxes on fuel. This increase creates a further disparity between the price of gasoline and the price of ethanol enhanced gasoline. These comparative advantages are created not by free market factors but by the tax incentive given ethanol producers.

If you have any further questions, we will try to answer them.

Yours truly,

LOSEE, CARSON & DICKERSON, P.A.

Joel M. Carson

JMC:bjk

cc: Mr. Bill Gray

NAVAJO REFINING COMPANY
POSITION PAPER

Navajo Refining Company is a petroleum refinery located at Artesia, New Mexico. Navajo produces three grades of gasoline, diesel fuel, jet fuels (both military and commercial), LPG's and asphalt. The refinery is over 50 years old. Since Navajo purchased the refinery in 1969 the refinery has spent over $58 million in capital improvements, of which $41 million has been spent in the last three years to enable Navajo Refining Company to produce an additional 200,000 gallons per day of gasoline. We presently employ in excess of 300 employees with an annual payroll in excess of $10 million.

Our purpose for being here is not to shut down the ethanol manufacturers but to reduce the tax incentives. When most of these plants were built, or when they committed to build, the State had a tax of 10¢ per gallon and the federal tax incentive was 4¢ per gallon, for a total of 14¢ per gallon. Since that time the tax incentives have increased by 2¢ per gallon. We feel, as a minimum, the ethanol manufacturers should be willing to reduce the total incentives by 3¢ per gallon to 8¢ which is still 3¢ per gallon better than the tax incentive of our neighboring states.

Based on the 11¢ per gallon gasohol incentive, and the expected ethanol production of 19.2 million gallons per year, there will be $21.1 million per year removed from the New Mexico road funds. For every additional one million gallons of ethanol produced an additional $1.1 million of revenue will be taken from the road funds. The ethanol industry itself said they would like to produce 22.5 million gallons per year. Our main concern here is for every dollar removed, a dollar has to be placed back into the road funds. Where is it going to come from? It is obvious at this point that it has to come from the gasoline that does not contain ethanol. I think this is a typical case of robbing Peter to pay Paul.

We have heard here that we do not want to invite industry in and then "pull the rug out from under them". We agree totally! Navajo spent in excess of $41 million of private monies over the last three years in order to maintain its position in the market place. It can compete in the gasoline market, but it should not have to compete against the State of New Mexico. The reason we did not object sooner than this is that last year stated there would be no fiscal impact until the year 1987-88.

To summarize my statement, gasoline consumption in the State is down from previous years and production capabilities have increased. Therefore, supply is greater than demand and it is tough to go after the "incremental" gasoline sales when you are competing with a product that is subsidized at a rate of $1.60 per gallon.

For your information, over the past three or four years there have been in excess of 80 refineries shut down in the United States. We, too, are fighting for our survival and industry.

STATE OF NEW MEXICO
OFFICE OF THE GOVERNOR
SANTA FE
87503

TONEY ANAYA
GOVERNOR

December 16, 1983

Senator Caleb Chandler
1919 Miller Street
Clovis, New Mexico 88101

Dear Senator Chandler:

This is in reference to recent discussions about the possiblity of this administration seeking to accelerate the phase out of the gasohol tax credit.

This proposal is part of a list of options that I had asked the Taxation and Revenue Department to prepare for purposes of finalizing our tax package. I had pared the initial list downward from a $600 million package to approximately $250 milion, and, in the process, had pared down the proposed acceleration in the phase out of the gasohol tax credit from $500,000 to $100,000 in the first year. As Bob McNeill told the Ethanol Producers Association, we are continuing to evaluate the effect of all of our tax proposals.

I appreciated the presentation that the New Mexico Ethanol Producers Association made to Bob in Clovis last week, and based on the information I reviewed from that meeting, I've concluded that we should not consider any change in existing law in this area. As you know, current law calls for a phase out during the period 1987 to 1991. I would agree that investors need to know that we will not alter that schedule.

I also want to take this opportunity to acknowledge the importance of the ethanol plants to our communities in eastern New Mexico, the economic benefits that the plants are providing our State, and the market for our grain that results from ethanol production.

Thank you for your bringing this to my attention.

Sincerely,

TONEY ANAYA
Governor

TA/rm/cjm

STATE OF NEW MEXICO
OFFICE OF THE GOVERNOR
SANTA FE
87503

TONEY ANAYA
GOVERNOR

December 16, 1983

Representative Hoyt Pattison
Star Route, Box 58
Clovis, New Mexico 88101

Dear Representative Pattison:

This has reference to the gasohol tax credit issue which has been the subject of discussion recently.

Based on the information presented to Bob McNeill in Clovis last week by the New Mexico Ethanol Producers Association, I believe we should make it clear to the industry that no efforts to alter existing laws in this area will be undertaken. I appreciate the importance of the ethanol plants to eastern New Mexico, and I want to underscore that my administration will not take any action that would adversely affect the industry.

I look forward to continued growth and economic health of the New Mexico ethanol industry, and I appreciate your views on this issue. I hope this information will be reassuring to investors and others who are working on ethanol production in New Mexico.

Sincerely,

TONEY ANAYA
Governor

TA:RM:co